InSpeed™ Model 335

Managed Storage Switch

VIXEL

INSTALLATION&CONFIGURATION*guide*

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CHAPTER 1 Introduction

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Important safety, electromagnetic compatibility, and regulatory information is contained in the guide titled *Safety & Regulatory Guide*. The installation and use of this product must be in accordance with the information given in that guide.

About This Guide

This guide is designed to provide the user with the necessary information to install the Vixel Model 335 Switch and associated Small Form-Factor Pluggable Transceivers (SFPs) for use in Fibre Channel applications in typical Storage Area Networks (SANs).

Overview

The twelve-port switch provide 1 or 2 Gigabit per second (Gb/s) Fibre Channel support and the flexibility of SFP-based design in a 1U full-rack size. The switch is designed as a twelve-port central interconnect for Fibre Channel applications and supports the ANSI FC-AL standard.

Note: Nodes include host computers, servers, and storage arrays.

Devices are connected to the switch through Small Form-factor Pluggables (SFPs) transceivers and cables. Each attached node has 1 or 2 Gigabit-per-second (Gb/s) of available bandwidth; however, all ports must be set to the same speed. Ports with no inserted SFPs or with inoperative nodes are bypassed. The switch's LED indicators provide status information to service personnel to indicate whether the port is active or bypassed.

Features

The switch incorporates the following features:

- InSpeed™ Technology
- Operating speeds of either 1.0625 or 2.125 Gb/s.
- Standard 1U size for easy installation into standard rack or placement on a tabletop.
- Twelve SFP ports for total cabling flexibility and scalability.
- Management through the switch's integrated web server or command line interface (CLI).
- 10BaseT Ethernet and RS-232 Serial ports on the switch.
- Switching and non-switching operating modes.
- System and port status LED indicators
- Auto-sensing, universal power supply supporting 100 to 250 VAC and 50 or 60 Hz.

Fibre Channel-Arbitrated Loop

The Fibre Channel-Arbitrated Loop (FC-AL) is an ANSI standard (X3T11) designed to provide shared bandwidth over low-cost media. Early adopters primarily use the SCSI protocol transported over Fibre Channel for distributed server and storage cluster applications. The switch is a central point of interconnect designed to maintain a fault-tolerant physical loop topology.

InSpeed™ Technology

Vixel's InSpeed™ technology enables the switch's router to properly utilize the switch core in sending data from one port to another. This process allows for multiple, simultaneous conversations between ports — effectively multiplying bandwidth. Using an advanced switching architecture that couples a non-blocking crossbar switch with unique port logic and per-port SERDES', the InSpeed™ technology creates the industry's highest-density Fibre Channel switch.

This technology provides the same performance as switches that support FC-SW2, while solving the latency problems associated with large FC-AL loops. During initialization, InSpeed™ connects all devices together in a standard FC-AL2 loop. Upon completion of the initialization process, InSpeed™ transitions to switching mode. When arbitration is attempted, InSpeed™ analyzes connections and routes traffic directly to the destination port.

The InSpeed™ switch is bufferless and operates on only the lower seven bits of the full Fabric address field. Aside from the time it takes to complete a LIP sequence, the switch operates at full switching bandwidth that reaches wire speeds of 200 MB/s.

CHAPTER 2 Installation

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Unpacking the Switch

To unpack the switch:

1. Inspect the outer shipping container for any damage that may have occurred in shipping and report any sign of damage to the appropriate shipping agency.
2. Remove the switch from the shipping container; save the shipping container, foam, and anti-static bags—returning the switch in any other container or packing material may void its warranty.
3. Inspect the switch thoroughly. (If any signs of damage are seen, notify your sales representative and/or the shipping agency.)

Installing the Switch

You can install the switch into an equipment rack or place it on a desktop.

Note: For information on environmental requirements, see "Operating Conditions" on page 59.

To mount the switch in a rack, consult the installation documentation that shipped with the rack-mounting kit (ordered separately).

To place the switch on a desktop:

1. Turn the switch upside down so the case bottom is facing up.
2. Install a self-adhesive pad on each corner of the switch (prevents surface damage) at the corner marks on the switch underside.
3. Turn the switch right side up so the case bottom is facing down.

Note: The plug on the power cord is intended to serve as the disconnect device. To cycle power to the switch, remove and reconnect the switch's power cord.

4. Attach one end of the switch's power cord to the switch's power inlet socket and the other end to a properly earthed receptacle (outlet).
5. Insert the power cord firmly into the power inlet socket.

   The switch is now powered on. The switch automatically executes a Power-On Self Test (POST) and its LEDs display the test results (for a description of the POST sequence, see "Performing a Power On Systems Test" on page 4).

Using Small Form-Factor Pluggable (SFP) Transceivers

The switch supports any SFP module that complies with the SFP specification as produced by MSA consortium.

The SFPs are "hot-pluggable" into the switch which allows host computers, servers and storage modules to be added dynamically without requiring power removal from the switch or any connected devices.

Small Form-Factor Pluggable (SFP) Installation

An SFP plugged into the switch will be automatically inserted when it is ready to begin initialization.

To insert an SFP, slide the SFP into the port, ensuring the correct orientation, until the latch clicks into place.

Small Form-Factor Pluggable (SFP) Removal

Removal of SFPs from a switch port causes the automatic bypass of that port. The remaining switch ports continue to operate normally with no degradation of system performance.

To extract an SFP, determine first what kind of extraction mechanism the SFP has.

Note: Most SFPs require you to remove the cable prior to removing the SFP from the port.

If the SFP has a removal tag, pull the removal tag to extract the SFP from the port.

If the SFP has a small plastic slider on the bottom side under the optical connector, simultaneously push in the slider and pull out the SFP.

If the SFP has a bale (small metal clasp), unlatch the bale and pull on it to extract the SFP from the port.

Performing a Power On Systems Test

When the switch is powered on, the switch runs through Power-On Self Test (POST) diagnostics to verify the fundamental integrity of the switch box.

1. All switch LEDs turn on (LEDs illuminate) for approximately two seconds during power on, then all LEDs—except for the Power LED—turn off (LEDs extinguish).
2. If the port bypass LEDs are blinking at a constant rate and the Switch Fault LED is on, the switch has detected a hardware fault—contact an authorized service person.

Setting Up the Switch

Before the switch can establish communication with your network, its IP Address needs to be changed from its default value.

To set the IP Address:

1. Attach one end of an RS-232 null modem cable to the serial port on the workstation; attach the other end to the RS-232 port on the switch.
2. *For Unix workstations,* type the following command at a Unix prompt (where ***`SerialPortDevicePath`*** is the filepath to the serial port used for connection):
   `cu -s 19200 -b 8 -l SerialPortDevicePath`
   For Windows® platforms, open a terminal session through a terminal emulation program (such as HyperTerminal) with the appropriate serial port (for example, COM1) and the following serial port parameters:
   - Bits per second: 19200
   - Data bits: 8
   - Parity: None
   - Stop bits: 1
   - Flow control: Xon/Xoff

   You are now connected to the CLI.
3. To log onto the CLI, type **`li`** at the prompt, then type the password (the default password is **`password`**).
4. To change the switch's IP parameters, type **`co`** and then type **`1`** to change the switch's IP address.
5. If you want to change the switch's netmask and default gateway, type **`2`** and **`3`**, respectively.
6. Type **`5`** to save changes and reset the management agent. (The management agent must be reset for the change to take affect.)
7. To log off the CLI, type **`lo`** at the prompt.

For more information on configuring the switch through the CLI, see "Using the Command Line Interface (CLI)" on page 36.

Attaching Devices

To attach devices to the switch:

1. Insert an active (that is, Ethernet hub- or Ethernet switch-attached) Ethernet RJ-45 twisted pair cable into the switch's 10BaseT management port and ensure that the Enet Act (Green) LED is on (LED illuminates).
   Note: You can attach cables to SFPs before or after SFP insertion (the switch bypasses ports that do not have attached cables).
2. Remove dust covers or plugs from the SFPs, if provided.
3. For each device:
   a. Attach a cable to the device.

CAUTION: Forcing an SFP into a port may damage the SFP and/or port.

   b. Attach the other end of the cable to a SFP and insert the SFP into a switch port, using minimal pressure and fitting the SFP housing's integral guide key into the port until the SFP's tabs click into place.

Note: FC-AL compatible nodes must perform initialization procedures upon power-up in order to function properly. It is the responsibility of the Fibre Channel driver software on FC-AL nodes to perform the initialization or re-initialization (depending on its prior state of operation).

4. Make sure the switch and any other connected switches or hubs are powered on.
5. Power on the storage devices (such as JBODs and RAIDs), then power on the hosts. The network initializes.
6. Check all port LEDs. For more information on Port LED status, See "Port LEDs" on page 7.
7. Check the green Switch Op (Switch Operational) LED. If the Switch Op LED is lit, all zones with inserted devices are operational. If the Switch Op LED is blinking in a multiple zone configuration, one or more zones are operational while others are not. If the Switch Op LED is off, no operational zones exist or no devices are attached.

   Note: Improper initialization could be the result of a defective or inoperative host bus adapter card or device. Consult the vendor's documentation for adapter diagnostic procedures.

Understanding the Switch's LEDs

You can check the system and port status through the Light-Emitting Diodes (LEDs) on the switch.

The switch utilizes two sets of LEDs to indicate switch and port status:

1. System LEDs – Six separate LEDs that indicate the status of the switch separate from the Port LEDs.
2. Port LEDs – Two LEDs per switch port that indicate status of that specific port

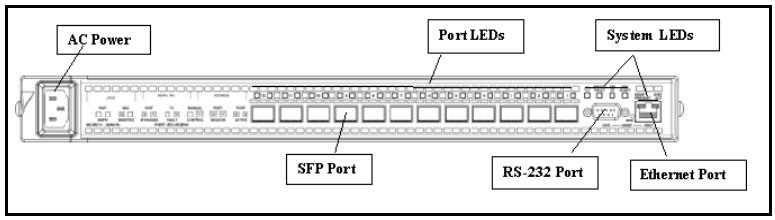

Figure 2-1. *Switch features diagram*

Power On

When powering on the switch, all LEDs turn on for two seconds and then off for two seconds except for the Power LED, which remains lit while the switch is powered.

System LEDs

There are six LEDs that indicate the status of the switch, independent of the port LEDs:

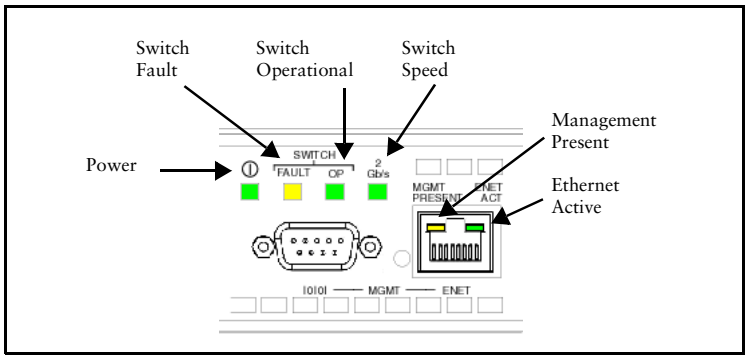

Figure 2-2. *System LEDs*

System LEDs	Indication
Power (green LED)	When lit, the switch is plugged in and the internal power supply is functional.
Switch Fault (yellow LED)	Indicates that the internal hardware self-test failed. When lit, the switch will not function. -or- Indicates that a fan has stopped operating or the ambient temperature has exceeded 45°C. When lit, the switch is still functional but requires immediate attention. The LED will turn off when the detected condition is corrected.
Switch Op (green LED)	Indicates whether the zones are initialized and operational. If the Switch Op LED is lit, all zones with inserted devices are operational. If the Switch Op LED is blinking in a multiple zone configuration, one or more zones are operational while others are not. If the Switch Op LED is off, no operational zones exist or no devices are attached.
2 Gb/s (green LED)	Indicates the current operational speed of the switch. When lit, the switch is operating at 2 Gb/s. If unlit, the switch is operating at 1 Gb/s.
Mgmt Present (yellow LED)	Indicates that switch management is functioning. If flashing, indicates that management functionality has failed and is not communicating with the switch.
Enet Active (green LED)	Indicates Ethernet activity on the switch and is controlled through the Ethernet transceiver.

Port LEDs

Port LEDs indicate the current status of the particular port.The switch uses two port LEDs: SFP Status and Port Bypassed/Port Activity. The Port Bypassed and Port Activity LEDs share the same yellow/green LED.

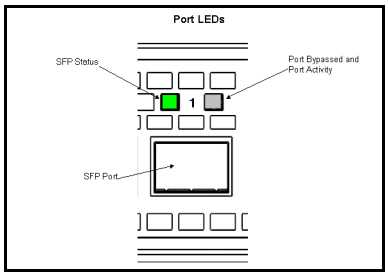

Figure 2-3. *Port LEDs*

An explanation of the Port LED indicators is listed below:

SFP Status LED	Port Bypassed/ Activity LED	Indication
Off	**Off**	Normal status of operation for ports in which SFPs are not installed. The port will be in the bypass state, which precludes the port from participating in the network.
On	**Off**	Normal operation. Port and device are operational.
On	**On (Yellow)**	Bypass. The port is non-operational due to loss of signal, poor signal integrity, or the attached node is sending LIP(F8,xx). This is the normal status condition when the SFP is present but not attached to a FC-AL node, or if it is only attached to a cable assembly with nothing attached at the opposite end. Replacing such a port (or replugging the same port twice) is considered to be a configuration change, which should initiate the Loop Initialization Procedure by the attached device.
Off	**On (Yellow)**	Tx Fault. The port is non-operational due to an SFP transmitter fault or improperly-seated SFP.
Off	**Blinking (Yellow)**	The port is being manually controlled by a management entity.
Blinking	**Blinking (Yellow)**	A management entity is forcing a port beacon to locate a particular port on the switch.
On	**On (Green)**	A connection has been made with the port. **Note:** This LED is only applicable when the port is operating in switching mode. If the port is in switching mode and the LED is off, the port is not currently involved in a transaction.

Cascading Switches

Cascading allows you to connect two or more switches together to increase the number of ports and available devices. The switch allows you to link up to 12 switches. Multiple cascades between switches provide link and communication redundancy. You may have up to three cascades between a pair of switches.

Note: The primary switch disables the transceivers on all redundant connections, so only the primary cascade is enabled. If the primary cascade goes down, another cascade is then enabled.

The primary cascade is determined by the order of discovery in the primary switch (the switch with the lower Serial Number). If the primary cascade fails in either switch, an automatic failover occurs on one of the other cascades.

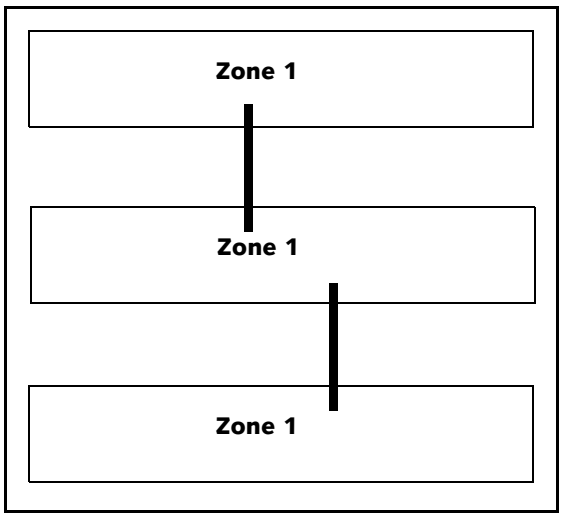

Figure 2-4. *Cascading Switches in Overlapping Zones*

Cascading with Non-Overlapping Zones

There are certain cascade restrictions when using non-overlapping zones. The following examples outline these restrictions.

1. You may only have multiple cascades between switches in Zone 1.

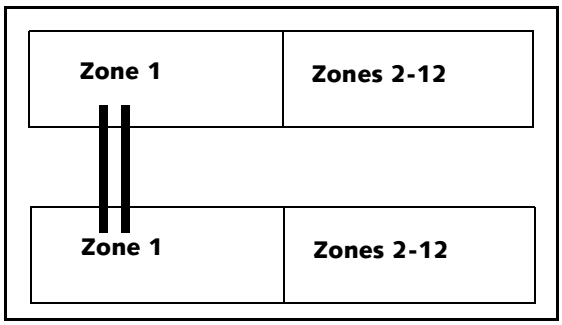

Figure 2-5. *ACCEPTABLE: Multiple Cascades in Zone 1*

2. You may not have multiple cascades in Zones 2-12.

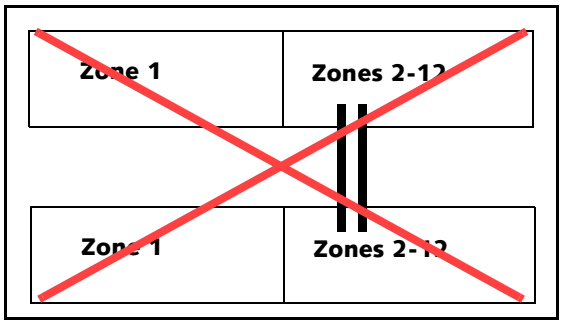

Figure 2-6. *NOT ACCEPTABLE: Multiple cascades in Zones 2-12*

3. You may have a single cascade in Zones 2-12 only.

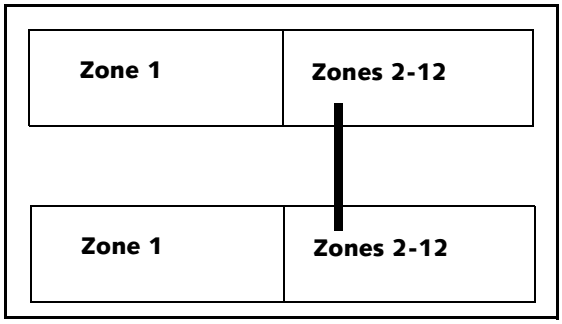

Figure 2-7. *ACCEPTABLE: Single Cascade in Zones 2-12 Only*

4. You may not create a cascade in Zone 1 and another cascade in Zones 2-12.

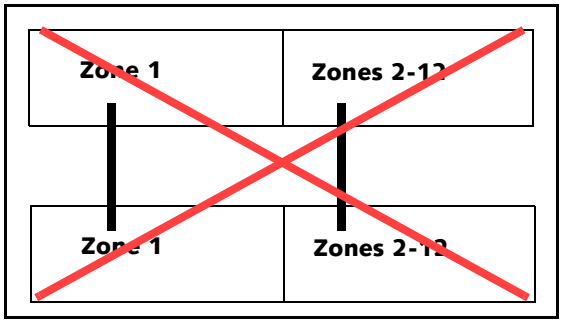

Figure 2-8. *NOT ACCEPTABLE: Cascades in Zone 1 and Zones 2-12*

For more information on zoning, see “Zone Settings” on page 31.

CHAPTER 3 Management

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Overview

The switch utilizes both a Web Manager interface and a Command Line Interface (CLI) to manage the switch. You can change the switch's device identification, upgrade firmware, configure switch settings and policies, define severity levels for event messages, and configure zoning.

Using the Web Manager

The Web Manager enables you to manage and monitor a switch from any network-connected computer. (Supported browsers are Netscape Navigator 4.7 or higher and Microsoft Internet Explorer 5.0 or higher. The browser needs to be Javascript-enabled.) With the Web Manager, you have the added benefits of easy navigation, simultaneous configuration of multiple ports, and named—rather than enumerated values within complex tables.

Connecting to the Web Manager

For a workstation to connect to the Web Manager, it must have access to the network on which the switch is connected.

If you need to verify the switch's IP address, log into the switch's command line interface through a serial link (see "Connecting to the CLI" on page 36).

To connect to the Web Manager:

1. Make sure the switch is connected to your network.
2. On a network-connected computer, open a web browser (such as Netscape Navigator or Microsoft Internet Explorer); in the URL text box, enter the switch's address (DNS name or IP Address).

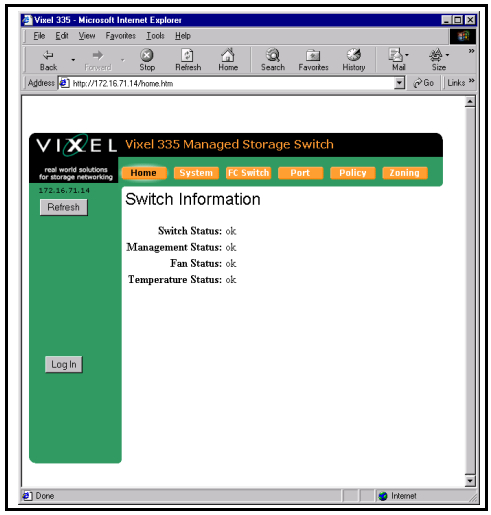


Figure 3-1. *Web Manager Home Page*

The Web Manager for the selected switch appears, and monitoring is available. Configuration links and elements are visible only when you are logged in, as noted in "Using the Command Line Interface (CLI)" on page 36.

Note: The web browser's appearance and information depends on the switch's active firmware version and may change without notice in subsequent firmware versions.

To display updated information while using the Web Manager, click the **Refresh** button on the page.

Navigation

To ensure that refreshed information is displayed, use the navigation links and buttons (such as "Back") that are on the Web Manager web pages. (The browser's "Back" and "Next" buttons usually display cached copies, which do not reflect the current information on the switch.)

The highlighted button at the top of the page indicates your current location.

Logging On and Off

Note: For security, passwords (for accessing the Web Manager & CLI) can only be changed through a serial connection to the switch.

The Web Manager does not require log-on unless you want to modify the switch's parameters or configuration (such as zone or policy configurations).

To log on to the Web Manager, click **Log In**, type the correct password (the default is **`password`**), and click **Log On**.

To log out of the Web Manager, click **Log Out** or close the browser window.

Note: One password is used to access both the Web Manager and the Command Line Interface. You can change the password through the Command Line Interface (CLI) only. Make sure you change the password after you log on the first time (for instructions, see "Changing the CLI/Web Password" on page 43).

Configuring the Switch

A quick list of frequent configuration tasks and their locations is shown here. More detailed information on each configuration task follows the table. Once you reach the location, you may need to click **Change Settings** and/or other links or buttons before configuration parameters are available for changing.

Configuration Task	Location in Web Manager
Change the switch speed (See "Switch Speed" on page 16.)	System > Change Settings
Change device identification, contact, and location (See "Switch Identification" on page 16.)	System > Change Settings
Upgrade firmware (See "Firmware Settings" on page 18.)	System > Firmware (click **Load New Firmware Image**)
Change the network settings (IP Address, Gateway, and Netmask) (See "Network Settings" on page 15.)	System > Change Settings
Change the time settings (See "Time Settings" on page 17.)	System > Time > Change Time Settings
Configure zoning (See "Zone Settings" on page 31.)	Zoning
View & download event log (See "Event Log Messages" on page 19.)	System > Event Log
Reset switch (See "Resetting the Switch" on page 13.)	Home (click **Reset Switch**)
View & update policies (See "Policy Settings" on page 29.)	Policy

Note: To configure switch settings, you must be logged into the Web Manager.

General switch status is shown on the Home page (click **Home**). You can click the options at the top of the page to view additional information and configure the switch. These options are discussed in more detail on the following pages.

Resetting the Switch

Changes to certain switch settings require you to reset the switch for those changes to occur. You must be logged into the Web Manager to reset the switch.

To reset the switch, click **Reset Switch** on the Home page.

System Information Settings

The System Informations page displays the switch's parameters and general configuration settings.

To view the system settings, click **System**. The System Information page appears.

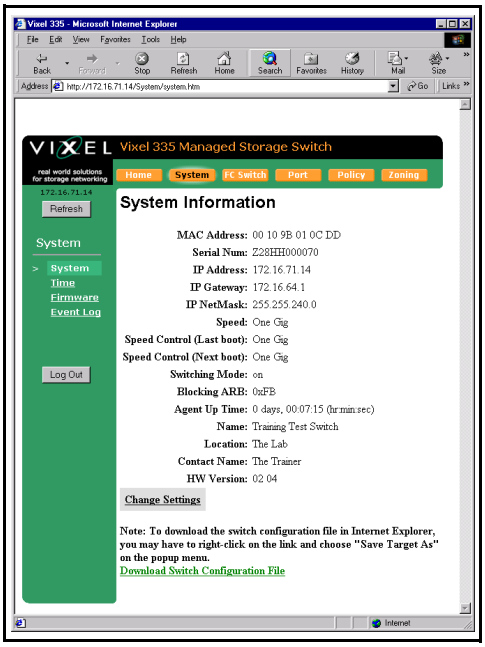


Figure 3-2. *System Information Page*

The displayed settings are listed below:

Setting	Description
MAC Address	A unique device address assigned to each switch at the factory. Cannot be configured or modified.
Serial Num(ber)	A unique identification number assigned to each switch at the factory. Cannot be configured or modified.
IP Address	The current IP Address for the switch.
IP Gateway	The current Gateway address for the switch.
IP Netmask	The current IP Netmask address for the switch.
Speed	The current speed setting for the switch.
Speed Control (Last boot)	The speed setting selected during the last switch power-up.
Speed Control (Next boot)	The speed setting selected for the next switch power-up.
Switching Mode	When "on", allows data to be sent directly to a specified port. If "off", the data is sent to every port. Disabling Switching Mode may be necessary when passing data to legacy devices.
Blocking ARB	When two ports start a communication session, the Blocking ARB is sent to all other ports trying to communicate with those ports until the connection is terminated. Blocking ARB is only active when the switching mode is on.

Setting	Description
Agent Up Time	The duration of time the switch has been operational.
Name	The name of the switch.
Location	The location where the switch resides.
Contact Name	The person's name to contact for switch issues.
HW Version	The hardware version of the switch. Cannot be configured or modified.

To modify the current settings, click **Change Settings**. The System Information page appears with the fields available for modification.

Figure 3-3. *System Information (Change Settings) Page*

Network Settings

You can change the switch's network settings (IP Address, Gateway, and Netmask) through the Web Manager once the switch has established communications with the network.

Note: To change the network settings of a switch that is not yet communicating with your network, connect through a null modem serial cable and change the IP Address through the CLI. For further information, See "Using the Command Line Interface (CLI)" on page 36.

To view the current network settings, click **System**.

To change the switch's network settings:

1. Click **Change Settings**.
2. Type the new setting (IP Address, Gateway, or Netmask) in the appropriate text box.
3. When finished, click **Submit**.

4. You must reset the switch for the new network settings to become active. To reset the switch in the Web Manager, click **Home** and then click **Reset Switch**. You may also reset the switch through the CLI. See "Resetting the Switch" on page 51.

Switch Speed

The switch is set to 2.125 Gb/s as the factory default switch speed.

To view the current switch speed, click **System**.

To change the switch speed:

1. Click **Change Settings**.
2. From the Speed Control (Next boot) drop-down box, select the desired speed.

Setting	Description
One Gig	Set switch speed to 1.0625 Gb/s.
Two Gig	Set switch speed to 2.125 Gb/s.

3. Click **Submit**. The next time you reset the switch the new switch speed will be applied.

Switching Mode

When enabled, switching mode allows data to be sent directly to a specified port. If switching mode is disabled, the switch sends data to every port. Disabling Switching Mode may be necessary when passing data to legacy devices.

To view the current mode, click **System**.

To change the switching mode:

1. Click **Change Settings**.
2. Select either "on" or "off" from the Switching Mode drop-down box.
3. Click **Submit**.

Blocking ARB

Note: This setting should not be modified unless directed to do so by Vixel Customer Service.

When two ports start a communication session, the Blocking ARB is sent to any other ports trying to communicate with those specific ports until their connection is terminated.

To view the current Blocking ARB value, click **System**.

Switch Identification

You may modify the switch's name, location, or contact name.

To view the current information, click **System**.

To change the switch identification:

1. Click **Change Settings**.
2. Enter the new value in the appropriate text box.
3. When finished, click **Submit**.

Downloading the Switch Configuration

You can download the current switch configuration to the Web Manager. The configuration file displays in text format.

To download the switch configuration, click **Download Switch Configuration File**. A text file appears displaying the current switch configuration. You can save or print the information.

Time Settings

To view the current time settings, click **System** and then click **Time**. The Time Information page appears.

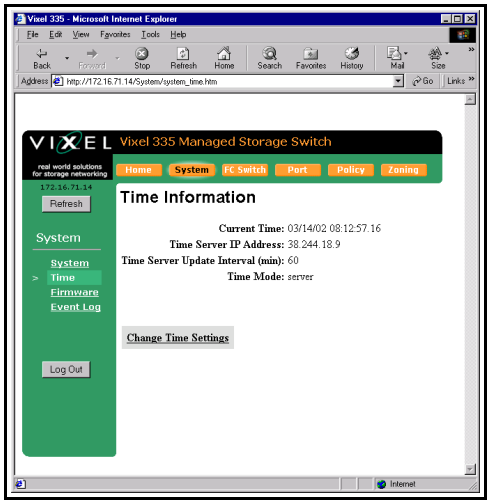


Figure 3-4. *Time Information Page*

To change the time settings, click **Change Time Settings**. The Time Information page appears with the fields available for modification.

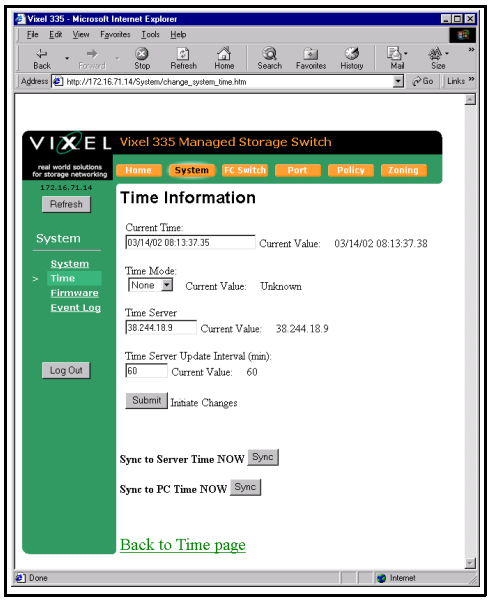


Figure 3-5. *Time Information (Change Settings) Page*

To change the Time Mode:

1. From the Time Mode drop-down box, select the desired time setting.

Setting	Description
none	The switch does not set the time.
Server	The switch receives the time from a time server via Ethernet.
User	The user manually sets the time for the switch.

2. Click **Submit**.

To use a time server:

1. Select **Server** in the Time Mode drop-down box.
2. Enter the IP Address for the time server in the Time Server text box.
3. Enter the desired update interval in minutes in the Time Server Update Interval (min) text box.
4. Click **Sync to Server Time** to immediately synchronize the server time to the time server at the designated IP Address.
5. Click **Submit**.

To set the time setting to the computer connected to the switch, click the Sync to PC Time Now **Sync** button and then click **Submit**.

Note: Clicking **Back** on the browser tool bar may not update settings due to web browser caching pages in memory.

To view the new time settings, click **Back to Time page**.

Firmware Settings

The Firmware page displays information on the current firmware version, the alternate firmware version, and the version of the software that loads the firmware image on boot up.

To view the current firmware settings:

1. Click **System**. The System Information page appears.
2. Click **Firmware**. The Firmware Information page appears.

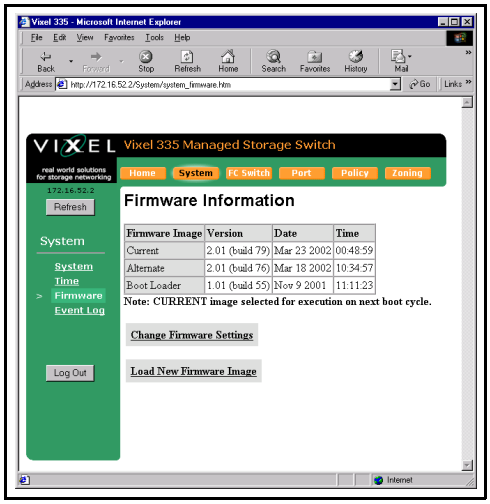


Figure 3-6. *Firmware Information Page*

To change the firmware settings:

1. Click **Change Firmware Settings**.
2. Click **Switch Image for execution on next boot** to swap the current firmware image and the alternate firmware image. The page informs you of which firmware image will be loaded on the next boot cycle.
3. Click **Back to Firmware page** to return to the Firmware page.
4. Review the Firmware Information display to ensure that the proper firmware image will be loaded on the next boot cycle.

To upgrade the firmware:

1. Click **Load New Firmware Image**.
2. Enter the directory path to the specific file in the text box, or click **Browse** to navigate to the appropriate file.
3. Click **Load Image** to download the firmware image.
4. Once the new image is downloaded, click **Back to Firmware page** to return to the Firmware page.
5. Review the Firmware Information display to ensure that the proper firmware image will be loaded on the next boot cycle.

Event Log Messages

The Event Log Messages page displays a list of event log messages generated by the switch. The event log holds approximately 500 messages at a time. For a complete list of event messages, see EVENT MESSAGES (**APPENDIX C**) on page 63.

To view the event log:

1. Click **System**. The System Information page appears.
2. Click **Event Log**. The Event Log Messages page appears.

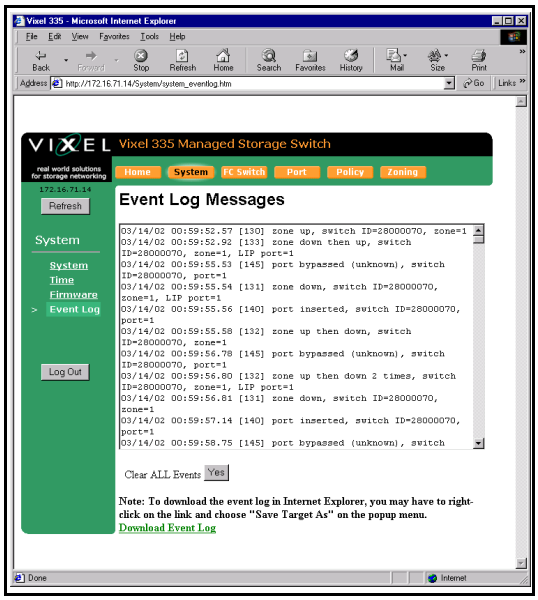


Figure 3-7. *Event Log Messages Page*

To save the event log messages:

1. Click **Download Event Log**.
2. Click **OK** to save the file to the disk.
3. Select the appropriate directory to save the event log messages and click **Save**.

To clear the current list of event log messages, click the **Yes** button next to Clear ALL Events.

FC Switch Information

The FC Switch Information page displays the switch view by ports. Each port displays the zone, utilization percentage, and associated ALPA(s). You can identify all ports in a specific zone by highlighting that zone.

To view the switch settings, click **FC Switch**. The FC Switch Information page appears.

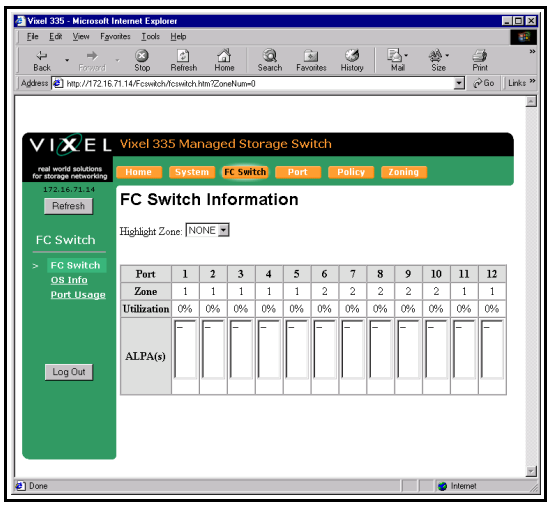


Figure 3-8. *FC Switch Information Page*

The displayed settings are listed below:

Setting	Description
Port number	The port number on the switch.
Zone number	The zone number to which the port is assigned.
Utilization percentage	Measures the amount of traffic that is flowing through the port.
ALPA(s)	The Arbitrated Loop Physical Address for each device connected to the port.

To highlight a specific zone, click the **Highlight Zone** drop-down box and select the desired zone. The highlighted zone displays in color.

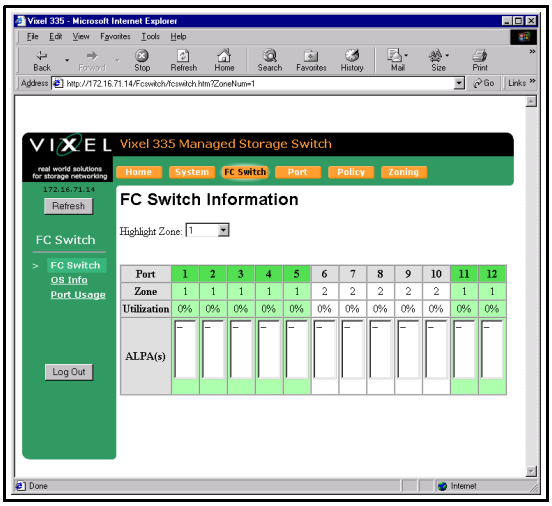


Figure 3-9. *FC Switch Information Page with Highlighted Zones*

You can also view Ordered Set and Port Usage information.

OS Information

The Ordered Sets Information page displays the Ordered Sets that are being transmitted on the switch by their associated port number.

To view the Ordered Sets Information page:

1. Click **FC Switch**. The FC Switch Information page appears.
2. Click **OS Info**. The Ordered Set Information page.

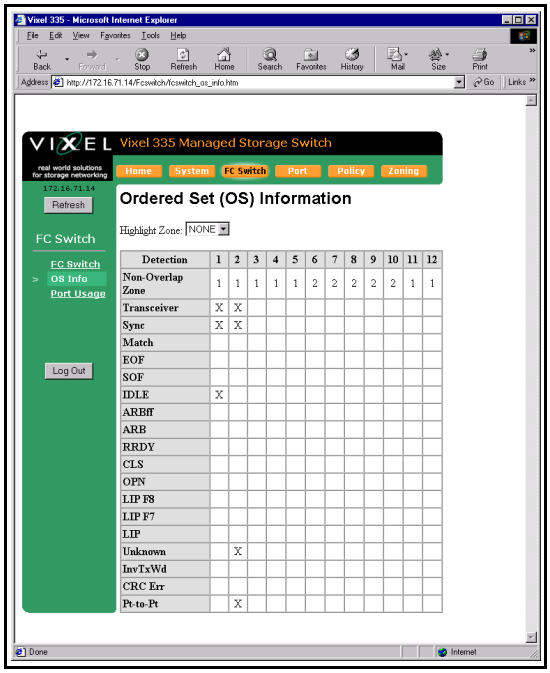


Figure 3-10. *Ordered Set Information Page*

If there is a connection, then the Ordered Set transmission information for that connection is depicted by an "X".

A list of the Ordered Sets and their indications follows:

Detection	Indication
Non-Overlap Zone	Displays the zone for which the port is configured.
Transceiver	Displays the status of the inserted transceiver in the port.
Sync	A stable signal has been detected and IDLEs transmitted.
Match	The ordered set or pattern selected under the Match area has been detected.
EOF	An End-of-Frame (EOF) delimiter has been detected; frames are present on the loop. (An EOF immediately follows the CRC of a frame and signals the frame's end.)
SOF	A Start-of-Frame (SOF) delimiter has been detected; frames are present on the loop.
IDLE	Sequences of IDLEs are being transmitted to maintain link activity; no other data is being transmitted.
ARBff	ARB(FF)s are being transmitted to maintain link activity; no other data is being transmitted.
ARB	A port is arbitrating for loop access to perform a task.

RRDY	The receiving node on this port has sent an R_RDY signal, indicating that it is ready for a frame to be transmitted over the link.
CLS	The port is attempting to begin the process of closing the current loop circuit.
OPN	The port is attempting to open communications with another port on the loop. **Note:** As is the case with some ordered sets, an OPN may not go all the way around the loop, instead stopping at its destination.
LIP F8	A non-switching port has detected a loop failure on its receive input, is notifying other ports, and is determining whether the loop is still operational. Some events that could cause the port to detect loop failure follow: • A device in the loop has failed. • A device in the loop has been powered off. • The physical connection between the transmitter and receiver is broken. • Activating the port bypass circuit does not typically result in a loop failure.
LIP F7	A loop port is in the non-participating mode and is attempting to win arbitration and begin initialization, possibly because the port was reset or is powering up. Sometimes the port is sending this sequence to another, hot-cascaded switch like a new initiator being inserted in the loop.
LIP	A Loop Initialization Primitive (LIP) sequence has been detected and action has been taken.
Unknown	The switch can not determine what is being transmitted.
InvTxWd	An invalid transmit word has been detected.
CRC Err	A Frame CRC error has been detected.
Pt-to-Pt	A point-to-point connection has been detected.

To highlight a specific zone, click the **Highlight Zone** drop-down box and select the desired zone. The highlighted zone displays in color.

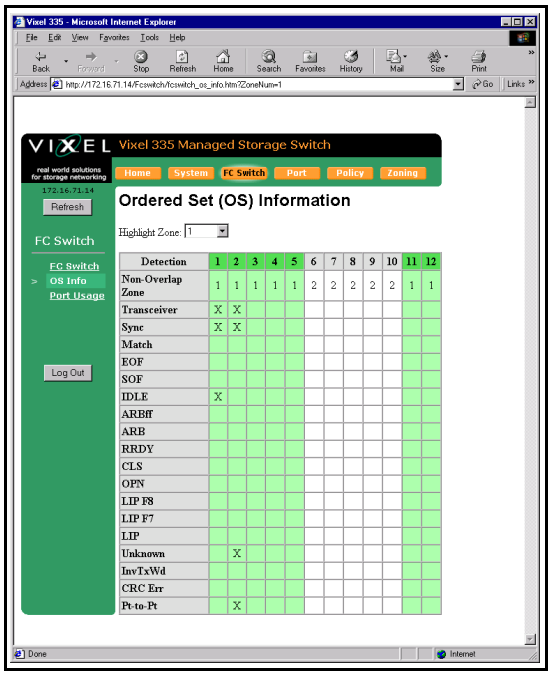


Figure 3-11. *Ordered Set Information Page with Highlighted Zones*

Port Usage Information

The Received Port Utilization page displays the ports and enables you to view the utilization percentages to determine which ports are busy.

To view the Received Port Utilization page:

1. Click **FC Switch**. The FC Switch Information page appears.
2. Click **Port Usage**. The Received Port Utilization page appears.

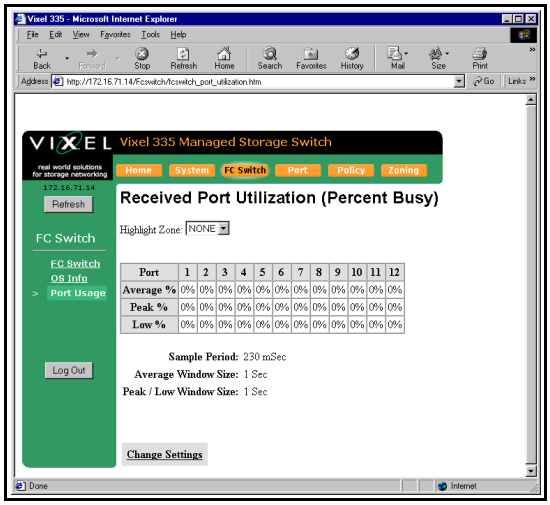


Figure 3-12. *Received Port Utilization Page*

The Utilization Percentages values are:

Value	Description
Average %	The average percentage data for the port in the zone over a period of Average Window Size seconds.
Peak %	The Peak data communication rate usage for the port
Low %	The Low data communication rate usage for the port.

The sample period, average windows size, and peak/low window size values are also displayed.

To highlight a specific zone to view traffic patterns, click the **Highlight Zone** drop-down box and select the desired zone. The highlighted zone displays in color.

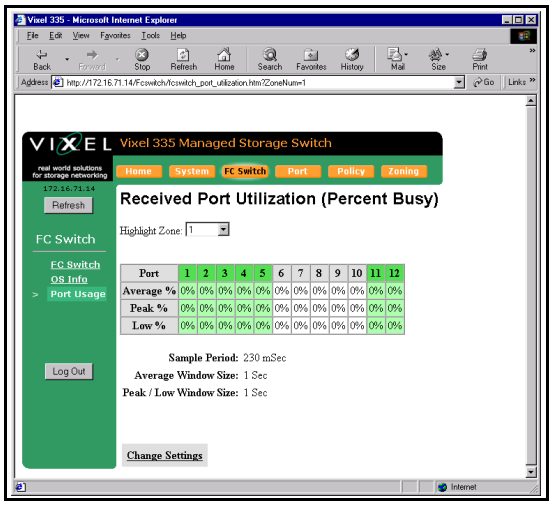

Vixel 335 - Microsoft Internet Explorer
Vixel 335 Managed Storage Switch
Home
System
FC Switch
Port
Policy
Zoning
Refresh
Received Port Utilization (Percent Busy)
Highlight Zone:
FC Switch
FC Switch
OS Info
Port Usage
Port 1 2 3 4 5 6 7 8 9 10 11 12
Average % 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%
Peak % 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%
Low % 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0% 0%
Sample Period: 230 mSec
Average Window Size: 1 Sec
Peak / Low Window Size: 1 Sec
Log Out
Change Settings

Figure 3-13. *Received Port Utilization Page with Highlighted Zones*

To change the Port Usage settings:

1. Click **Change Settings**. The Received Port Utilization page appears with fields available for modification.

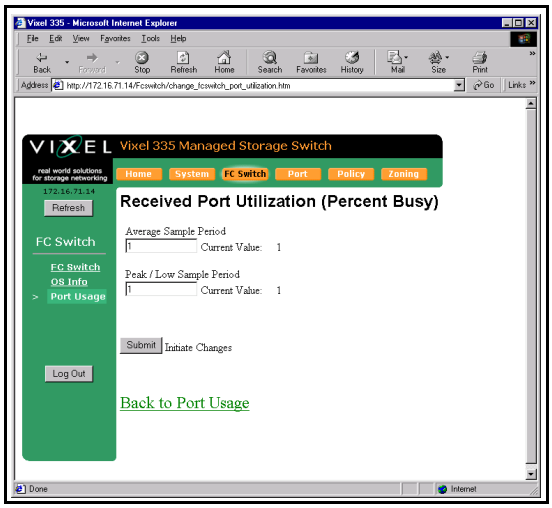


Figure 3-14. *Received Port Utilization (Change Settings) Page*

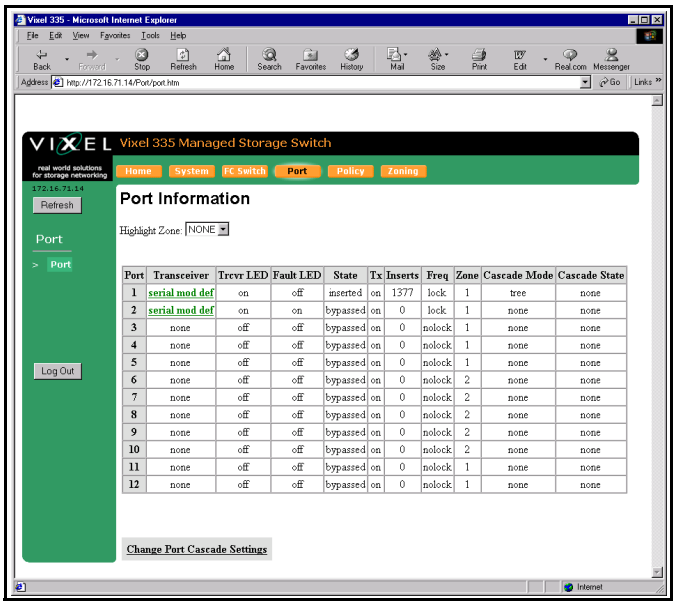
2. You may change the Average Sample Period and Peak/Low Sample Period values (in seconds) by entering new values in the appropriate text boxes. The Sample Period value cannot be modified.

3. Click **Submit** to accept the changes.
4. Click **Back to Port Usage** to view the new settings.

Port Settings

The Port Information page displays the port status for each port on the switch.

To view the port settings, click **Port**. The Port Information page appears.



Port	Transceiver	Trcvr LED	Fault LED	State	Tx	Inserts	Freq	Zone	Cascade Mode	Cascade State
1	serial mod def	on	off	inserted	on	1377	lock	1	tree	none
2	serial mod def	on	on	bypassed	on	0	lock	1	none	none
3	none	off	off	bypassed	on	0	nolock	1	none	none
4	none	off	off	bypassed	on	0	nolock	1	none	none
5	none	off	off	bypassed	on	0	nolock	1	none	none
6	none	off	off	bypassed	on	0	nolock	2	none	none
7	none	off	off	bypassed	on	0	nolock	2	none	none
8	none	off	off	bypassed	on	0	nolock	2	none	none
9	none	off	off	bypassed	on	0	nolock	2	none	none
10	none	off	off	bypassed	on	0	nolock	2	none	none
11	none	off	off	bypassed	on	0	nolock	1	none	none
12	none	off	off	bypassed	on	0	nolock	1	none	none

Figure 3-15. *Port Information Page*

The displayed settings are listed below:

Setting	Description
Port	The actual port on the switch.
Transceiver	The type of transceiver inserted in the port.
Trcvr LED	If a transceiver is inserted properly, the LED is on.
Fault LED	The port is bypassed due to a problem detected by either the transceiver's transmit logic or the SFP transceiver itself. Transceiver problems include unconnected fiber, remote node not transmitting, LIP(F8), or a faulty transceiver.
State	The current state of the selected port.
TX	The state of the transmitter on the selected port.
Inserts	The number of times a transceiver has been inserted into the port since the last switch reset.
Freq	The port locked in on the communicating frequency for which the switch is configured.
Zone	The zone in which the port is located.
Cascade Mode	Displays the cascade mode for the specified port.
Cascade State	Displays the cascade state for the specified port.

To highlight a specific zone, click the **Highlight Zone** drop-down box and select the desired zone. The highlighted zone displays in color.

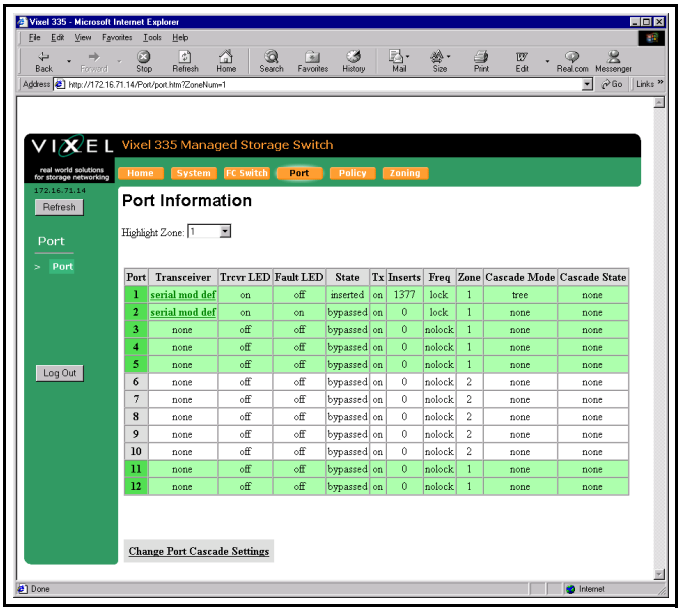


Figure 3-16. *Port Information Page with Highlighted Zones*

To view information on a transceiver connected to a port, click **serial mod def** in the transceiver column. The specific transceiver's information displays to the right of the current switch information.

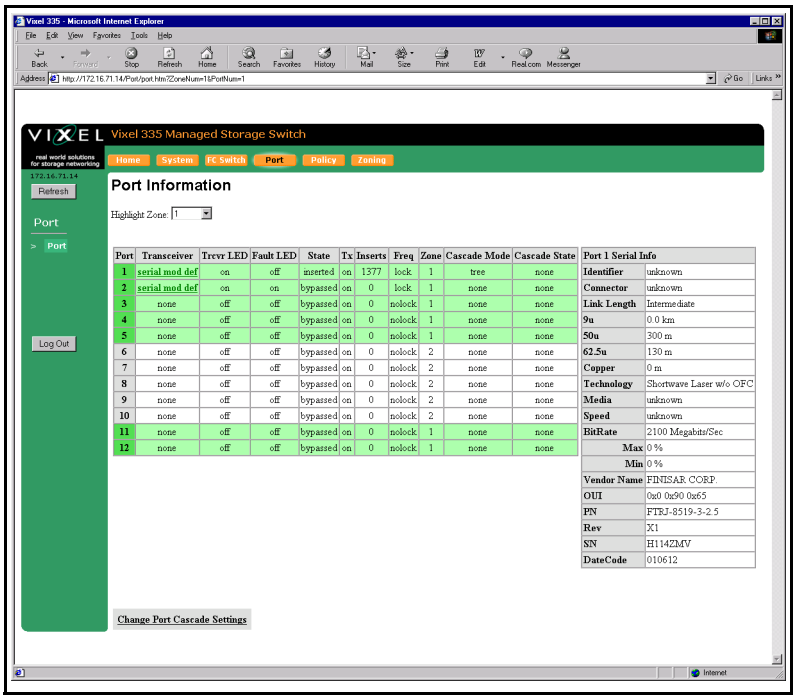


Figure 3-17. *Port Information Page with Transceiver Information*

To modify the port cascade settings:

1. Click **Change Port Cascade Settings**. The Cascade Information page appears.

Figure 3-18. *Cascade Information Page*

2. On this page, you can view the port settings, highlight a specific zone, or change the port cascade mode.
3. Select the port to modify by clicking the Cascade Mode drop-down box for the specific port.
4. Select the port cascade mode, which configures the port's operation in the switch. The different port cascade modes are:

Mode	Description
auto	This setting automatically configures the connection type based on information sent by other InSpeed switches. The default setting is Auto for InSpeed-based managed switches.
none	The port is disabled.
tree	A port that allows arbitration fairness to other cascaded InSpeed-based switches or ports connected to end devices. If the port is a tree port then the ARB (Arbitrate) is sent down the port and, when the ARB is received back at the ASIC, a connection is made between the source and destination ports. All ports are viewed as 100% FC_AL compliant.
string	A specially pre-allocated port designed to maintain fairness when two or more InSpeed-based storage switches are serially cascaded. When the destination port is a string and an OPN is received on the ASIC, an ARB is transmitted throughout the total string cascade loop to alert all devices to enforce the Loop fairness rules. Therefore, if two devices try to ARB for the loop at the same time, the higher Priority AL_PA will win the cascade first, the lower priority one will follow. **Note:** There must be two string ports on a zone. The port is configured for a pair of string ports to other switches.

Each Port can operate independently of the other ports except in String mode.

5. After making changes, click **Submit** to accept the changes.

To highlight a specific zone, click the **Highlight Zone** drop-down box and select the desired zone. The highlighted zone displays in color.

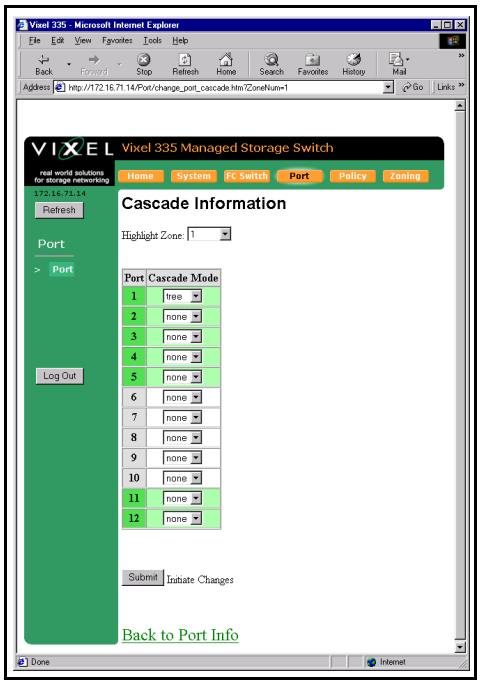


Figure 3-19. *Cascade Information Page with Highlighted Zones*

Policy Settings

Policies define switch operation and determine how the switch handles error recovery. The Policies page displays the switch policies that are enabled or disabled.

To view the policy settings, click **Policy**. The Policies page appears.

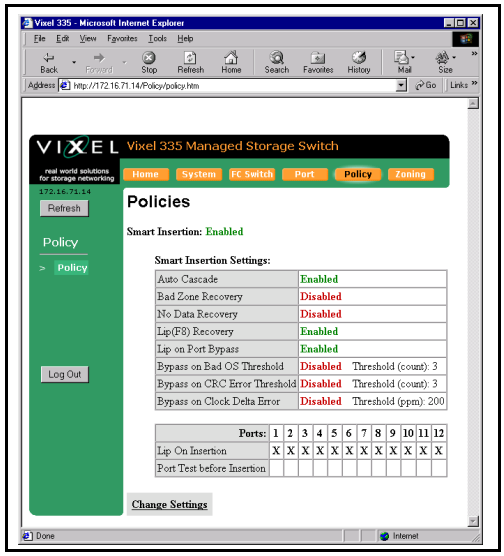

Vixel 335 - Microsoft Internet Explorer
Vixel 335 Managed Storage Switch
Home
System
FC Switch
Port
Policy
Zoning
Refresh
Policy
Policy
Log Out
Policies
Smart Insertion: Enabled
Smart Insertion Settings:
Auto Cascade Enabled
Bad Zone Recovery Disabled
No Data Recovery Disabled
Lip(F8) Recovery Enabled
Lip on Port Bypass Enabled
Bypass on Bad OS Threshold Disabled Threshold (count): 3
Bypass on CRC Error Threshold Disabled Threshold (count): 3
Bypass on Clock Delta Error Disabled Threshold (ppm): 200
Ports: 1 2 3 4 5 6 7 8 9 10 11 12
Lip On Insertion X X X X X X X X X X X X
Port Test before Insertion
Change Settings

Figure 3-20. *Policies Page*

The displayed settings are listed below:

Switch Policy	Description
Smart Insertion	When this policy is enabled, the switch LIPs on the insert of a new port and waits for LIP(f7)s to return prior to insertion. Also ensures that data meets the requirements of Fibre Channel Arbitrated Loop (FC-AL) and allows sub-policies to be enabled.
Auto Cascade*	When a port is connected to another Vixel Model 335 switch, the switch will automatically configure the port to the connected device type.
Bad Zone recovery*	The switch reinitializes the zone and will bypass zone ports that are down. The switch will bypass all ports when: • Zone 1 has a least one transceiver with a signal and the port is in auto mode. • No ports in the zone are in forced insert mode (Port Control). • The zone state is down.
No Data Recovery*	The switch will bypass a port if no K characters (Ordered Sets) are detected for 100 usecs. The switch will try to reinsert the port upon detection of valid K characters.
LIP(F8) Recovery*	The switch will bypass a port if a LIP(F8) is received. The switch will try to reinsert the port when no more LIP (F8)s are received.
LIP on Port Bypass*	When a port is bypassed, it issues LIP(F7)s to other zone members.
Bypass on Bad OS Threshold*	When a port exceeds the threshold of Ordered Set errors within ten seconds, the switch bypasses the port. **Note**: The threshold can be adjusted. ($2^{24} - 1$, the maximum expected error rate is one error within 15 minutes.)

Bypass on CRC Error Threshold*	When a port exceeds the threshold of frame CRC errors within ten seconds in Zone 1 and in switching mode, the switch bypasses the port. **Note**: The threshold can be adjusted.
Bypass on Clock Delta Error	When this policy is enabled, the switch compares the detected line clock through the frame and the number of fill words inserted or deleted versus the switch's internal clock. If the derived clock delta is too high, the port is bypassed.
LIP on Insertion*	When a port inserts into a zone, it issues LIP(F7)s to other zone members.
Port Test Before Insertion*	Before allowing a port to insert into a zone, the port is monitored for proper Loop Port State Machine (LPSM) protocols. (At least one of the devices on the port must be a Loop Initialization Master (LIM) to follow these protocols.)
* To set this policy, ensure that **Smart Insertion** is enabled.	

To update the switch's policies:

1. Click **Change Settings** on the Policy page. The Policies page appears with fields available for modification.

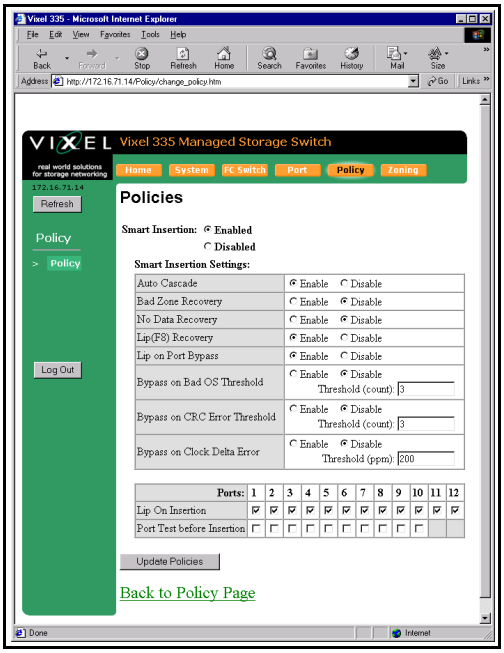


Figure 3-21. *Policies (Change Settings) Page*

2. You can select whether to enable or disable a specific policy, set thresholds on certain policies, and select specific ports for the LIP on Insertion and Port Test Before Insertion policies.
3. Once you have made your changes, click **Update Policies** to accept the changes.
4. Click **Back to Policy Page** to review the new settings.

Zone Settings

The switch uses two types of port zoning: Overlapping and Non-Overlapping Zones.

With overlapping zoning, devices on one port are not allowed to see devices on another port, yet those same devices can both see a device on a third port.

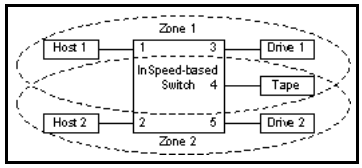


Figure 3-22. *Overlapping Zones*

In Figure 3-22, Zone 1 includes ports 1, 3, and 4, while zone 2 includes ports 2, 4 and 5. Port 4 overlaps both zones. Devices on ports 1, 3, and 4 can see each other and devices on ports 2, 4, and 5 can see each other, but devices 1 and 3 cannot see devices 2 and 5. Devices on port 4 can see all the devices on ports 1, 2, 3, and 5.

Non-overlapping zoning enables the switch to be divided into separate environments, where each environment sustains a complete 127-device AL_PA space.

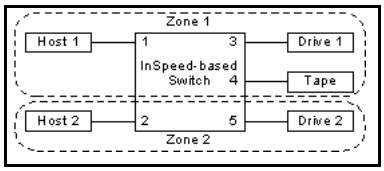


Figure 3-23. *Non-overlapping Zones*

In Figure 3-23, Zone 1 devices operate independently of devices in Zone 2. Non-overlapping zoning allows for true LIP isolation. If a LIP occurs in one non-overlapping zone, it will not affect the operation or traffic occurring in a different zone.

To view the zoning information, click **Zoning**. The Zone Information page appears.

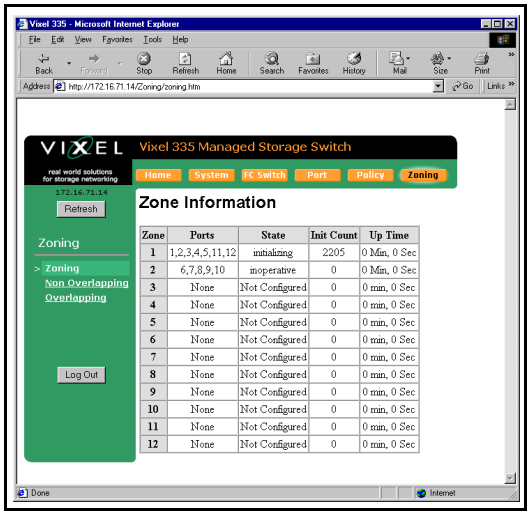

Vixel 335 - Microsoft Internet Explorer
Vixel 335 Managed Storage Switch
Home
System
FC Switch
Port
Policy
Zoning
Zone Information
Refresh
Zoning
Zoning
Non Overlapping
Overlapping
Log Out
Zone | Ports | State | Init Count | Up Time
1 | 1,2,3,4,5,11,12 | initializing | 2205 | 0 Min, 0 Sec
2 | 6,7,8,9,10 | inoperative | 0 | 0 Min, 0 Sec
3 | None | Not Configured | 0 | 0 min, 0 Sec
4 | None | Not Configured | 0 | 0 min, 0 Sec
5 | None | Not Configured | 0 | 0 min, 0 Sec
6 | None | Not Configured | 0 | 0 min, 0 Sec
7 | None | Not Configured | 0 | 0 min, 0 Sec
8 | None | Not Configured | 0 | 0 min, 0 Sec
9 | None | Not Configured | 0 | 0 min, 0 Sec
10 | None | Not Configured | 0 | 0 min, 0 Sec
11 | None | Not Configured | 0 | 0 min, 0 Sec
12 | None | Not Configured | 0 | 0 min, 0 Sec

Figure 3-24. *Zone Information Page*

The Zone Information page displays the current zoning configuration, the ports in each zone, the zone state, the init count, and the time duration ("up time") for the zone. The displayed settings are listed below:

Setting	Description
Zone number	The zone number on the switch (1-12).
Port number(s)	The port numbers that are assigned to the specified zone.
Zone state	The current state of the zone; either "up" or "down".
Init Count	The number of times a zone has transitioned from an "down" state to an "up" state.
Up Time	The amount of time that the zone has been operational.

Overlapping Zones

Overlapping zoning can only be implemented in Zone 1 and the switch must be operating in switching mode. To participate in overlapping zoning, each port must have their cascade mode configured to "auto".

If the switch is operating using non-overlapping zoning, you can still configure overlapping zoning within the default zone. If a LIP occurs on any port in the default zone, it will affect every port in the default zone, regardless of any overlapping zone configurations. Overlapping zones do not support LIP isolation.

To view the overlapping zoning, click **Overlapping**. The Overlapping Zone 1 Information page appears.

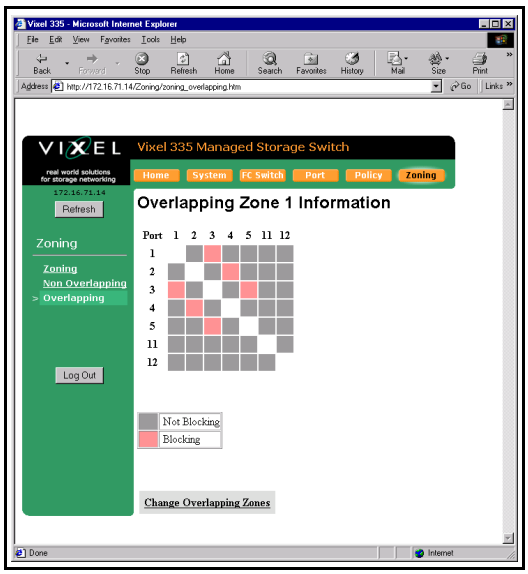


Figure 3-25. *Overlapping Zone 1 Information Page*

To configure the overlapping ports:

1. Click **Change Overlapping Zones**. The Overlapping Zone 1 Information page appears with the ports available for modification.

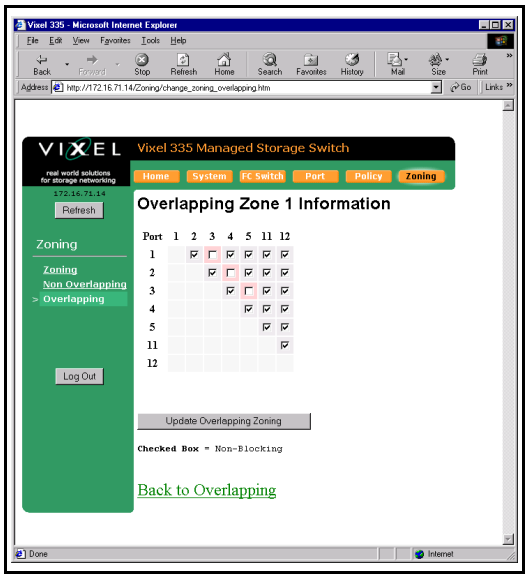


Figure 3-26. *Overlapping Zone 1 Information (Configuration) Page*

2. Click the appropriate check box for the two ports.
   If the check box is selected (checked), the two ports can communicate with one another. If the check box is empty (not checked), the two ports are blocked from communicating with one another.
3. Once you have configured the overlapping ports, click **Update Overlapping Zoning** to accept the changes.

To view the your changes, click **Back to Overlapping**. Blocked ports are displayed in red, while non-blocked ports are displayed in gray.

Non-Overlapping Zones

Note: Ports 11 and 12 can only be in Zone 1.

The non-overlapping zones feature enables you to assign each port on the switch to one of 12 available zones. Each zone is unique which allows for 6 separate zones to function on the same switch. With non-overlapping zoning enabled, each zone is totally independent and LIPs on one zone do not affect the other zones.

The default zone for the switch is Zone 1. Ports 11 and 12 are always included in Zone 1.

The switch provides LIP isolation through the LIP confinement properties of non-overlapping zoning. A LIP occurring in one zone will never affect the traffic or operations in another zone. Each zone operates completely independent of other non-overlapping zones.

Note: You can have simultaneous overlapping and non-overlapping zoning. Overlapping zoning operates in Zone 1 and non-overlapping zoning operates in Zones 2-12.

To view the non-overlapping zoning, click **Non Overlapping**. The Non Overlapping Zone Information page appears.

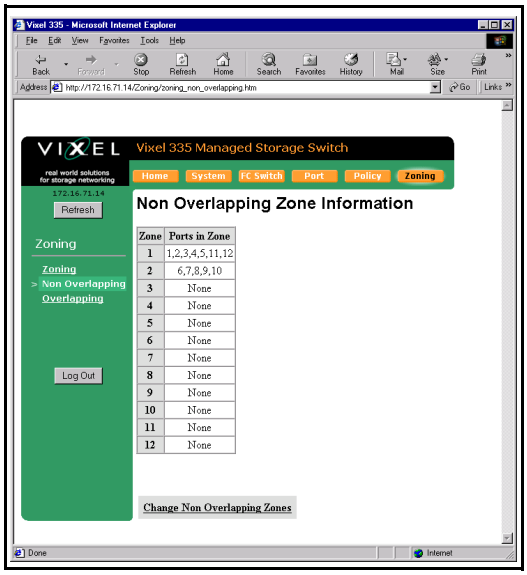


Figure 3-27. *Non-Overlapping Zone Information Page*

To modify the port configurations in the various zones:

1. Click **Change Non Overlapping Zones**. The Non Overlapping Zones Information page appears with the ports available for modification.

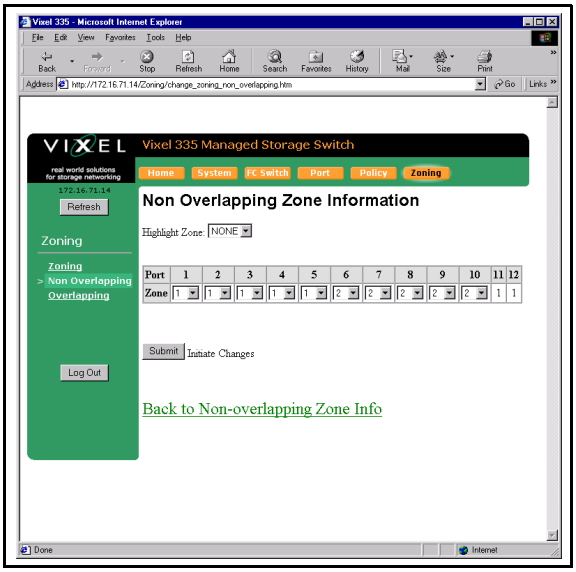


Figure 3-28. *Non-Overlapping Zones Information (Configuration) Page*

Note: Ports 11 and 12 are always in Zone 1.

2. Click the Zone drop-down box for the specific port and select the zone for which you want the port to be a member. The port can be in one of twelve zones.
3. Click **Submit** to accept the changes.
4. Click **Back to Non-overlapping Zone Info** to view the changes.

To highlight a specific zone, click the **Highlight Zone** drop-down box and select the desired zone. The highlighted zone displays in color.

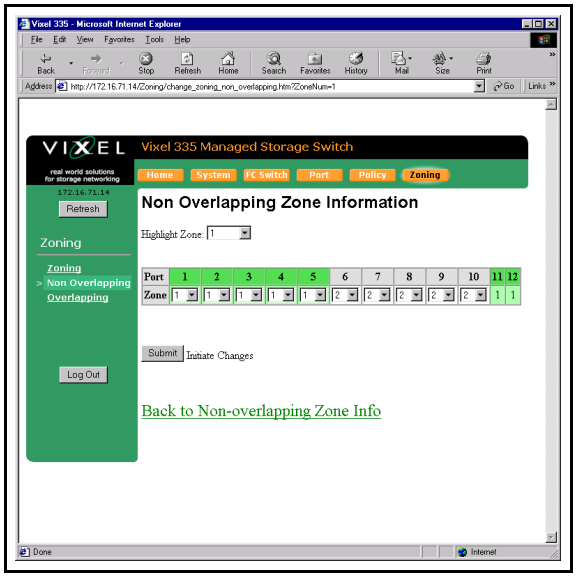


Figure 3-29. *Non-Overlapping Zones Information (Configuration) Page with Highlighted Zones*

Using the Command Line Interface (CLI)

The Command Line Interface (CLI) allows you to complete several switch management tasks over Ethernet through a telnet session or through a direct serial link. While both the CLI and Web Manager interfaces allow you to view switch information and configure switch settings, the CLI also allows you to enable or disable DHCP requests, change the CLI/Web Manager password, manage traps, and complete several other switch management functions.

Connecting to the CLI

Note: You may have up to 10 concurrent telnet sessions accessing the switch.

You can connect to the CLI over the telnet interface or the serial link interface.

To connect over Ethernet through telnet interface:

1. Make sure the Vixel Managed Switch is connected to an Ethernet network via the switch's Ethernet connection and that the monitoring workstation can access this Ethernet network.
2. Make sure that you know the switch's IP address before connecting to the CLI. (the default IP Address is **`0.0.0.0`**)
3. At a command line prompt, type **`telnet IP`** (where **`IP`** is the switch's IP address).

   You are now connected to the CLI and ready to log on.

To connect through a serial link:

1. Attach one end of an RS-232 null modem cable to the serial port on the workstation; attach the other end to the RS-232 port on the switch.
2. *For Unix workstations,* type the following command at a Unix prompt (where ***`SerialPortDevicePath`*** is the filepath to the serial port used for connection):
   `cu -s 19200 -b 8 -1 SerialPortDevicePath`
3. *For Windows® platforms,* open a terminal session through a terminal emulation program (such as HyperTerminal) with the appropriate serial port (for example, COM1) and the following serial port parameters:
   - Bits per second: 19200
   - Data bits: 8
   - Parity: None
   - Stop bits: 1
   - Flow control: Xon/Xoff

   You are now connected to the CLI and ready to log on.

Logging On and Off

To log onto the CLI (once connected as shown above), type **`li`** at the prompt, then type the password (the default password is **`password`**).

To log off the CLI, type **`lo`** at the prompt.

Make sure you change the password after you log on the first time.

Configuring the Switch

The CLI enables you to configure the switch settings, policies, and zoning.

A list of frequent switch configuration tasks and their commands is shown here. Refer to the provided page number for more detailed information on each configuration task.

Configuration Task	CLI Command
Change the IP parameters (See "Changing the Switch's IP Parameters" on page 38.)	**co**
Change switch identification, contact, location, etc. (See "Configuring Switch Information" on page 38.)	**si**
Upgrade firmware (See "Managing the Firmware" on page 39.)	**fw**
Add or delete a trap destination (through the Configuration menu) (See "Configuring the Trap Destination Table" on page 41.)	**ct**
Changing the password	**pw**
View switch management, policies, error thresholds, and other switch settings. (See "Viewing Management, Policy, and Threshold Settings" on page 43.)	**mc**
Change the switching mode (See "Changing the Switching Mode" on page 47.)	**sw**
Configure zoning (See "Viewing and Understanding Zoning Information" on page 52.)	**oz** (for overlapping zoning) **noz** (for non-overlapping zoning)
Reset switch (See "Resetting the Switch" on page 13.)	**rs**
Reset switch to factory default settings (See "Resetting the Switch to Factory Default Settings" on page 51.)	**rc**
View & modify port settings (See "Displaying Ports" on page 49.)	**po**
Change the switch speed (See "Changing the Switch's Operating Speed" on page 52.)	**lsp**
View the event log (See "Viewing the Event Log" on page 51.)	**ev**

To view the complete list of available switch commands while using the CLI, type **?** or **h** at the prompt. For a complete listing of all CLI commands, see CLI CONSOLE COMMANDS (**APPENDIX B**) on page 60.

Changing the Switch's IP Parameters

To view the current switch configuration, type **co** at the prompt. The Configuration Menu appears:

```
CONFIGURATION MENU
                      ACTIVE VALUE      SAVED VALUE       NEW VALUE
 1. IP Address        172.16.52.2       172.16.52.2
 2. Netmask           255.255.240.0     255.255.240.0
 3. Default Gateway   172.16.48.1       172.16.48.1
 4. DHCP              Disabled

 5. Save changes and reset switch
 6. Save changes and exit menu
 7. Discard changes and exit menu
```

Before the switch can establish communication with your network, its IP address needs to be changed from its default value.

To change the switch's IP parameters:

1. Type the option number (1-4) of the desired setting.
2. Enter a new value for that setting.
3. Type **5** to save changes and reset the switch. (The switch must be reset for the change to take affect.)

Enabling or Disabling DHCP Requests

When DHCP is enabled, the switch sends a DHCP request for its correct IP parameters (address, subnet mask, and default gateway) during power on. If a DHCP server responds, the switch automatically changes its IP settings.

Note: The default setting for the DHCP option is "disabled".

If you want to enable DHCP, ensure that there is a DHCP server connected to the same subnet as the switch. (For instructions on setting the switch's IP parameters through a DHCP server, see the server documentation.)

If DHCP is enabled and a DHCP server is not found, the DHCP request will fail and the switch's IP parameters will be incorrect. You will then have to connect through the serial port using the CLI, disable the DHCP mode, and manually configure the switch parameters.

To enable automatic DHCP requests from the switch:

1. Type **co**, then type **4**.
   The DHCP status is toggled to either enable or disable and the current setting is displayed.
2. Type **5** to save changes and reset the switch. (The switch must be reset for the change to take affect.)

Configuring Switch Information

To change the switch name, location, or contact name, type **si** at the prompt. The System Information Menu appears:

```
SYSTEM INFORMATION MENU
 1. Switch Name:            demo
 2. Location:               lab
 3. Contact Name:           John Smith
 4. Exit menu
```

To change the information:

1. Type the option number (1-3) of the desired setting.
2. Enter a new value for that setting.
3. Type **4** to exit the menu.

Managing the Firmware

To view the current firmware settings and a complete list of commands, type **fw** at the prompt. The Internal Firmware Versions list and Firmware Menu appear:

```
Internal Firmware Versions:
-----------------------------------------------------
CURRENT:   V2.01 (build 79)     Mar 23 2002   00:48:59
ALTERNATE: V2.00 (build 69)     Feb 27 2002   17:30:42
BOOT:      V1.01 (build 55)     Nov  9 2001   11:11:23

FIRMWARE MENU
 1. Show versions
 2. Select alternate version
 3. Load new firmware via Ethernet
 4. Load new firmware via serial
 5. Reboot
 6. Exit menu
```

The Internal Firmware Versions list displays the current and alternate firmware loaded on the switch. The Boot firmware is installed during the manufacturing process and manages the loading of the current firmware on the switch during power-up. The Boot firmware cannot be configured or modified.

To select the alternate firmware version, type **2** at the prompt. A message appears informing you that the Alternate firmware version has been selected and will load on the next switch boot.

Downloading New Firmware

You can use either of the following available download methods for Windows; for Unix workstations, use the Ethernet (TFTP) method.

To download firmware from a binary file, type **fw** and choose the desired downloading method.

Ethernet (TFTP) Method (Menu Option 3)

Use the Ethernet (TFTP) method for Unix workstations (this method can also be used on Windows NT workstations).

Note: The "Destination:" message varies according to the active firmware image and the platform you are using. See Step 2.

1. Type: **3** at the prompt.
   The following message appears.

   ```
   Ready for TFTP file transfer
   IP address: IPaddressForYourCard
   Destination: ramdisk
   ```

2. For Windows:
   - Use a command line to move to the directory containing the new firmware and type the following (where **IPaddress** is the switch's IP address and **filename** is the name of the binary firmware file) and press Enter.
     tftp -i *IPaddress* PUT *filename* ramdisk

     Within a few seconds, the "Transfer successful" message appears. (If the message does not appear, verify that the file is good and repeat the transfer.)
3. For Unix workstations:
   a. At a Unix prompt, type the following (where **IPaddress** is the switch's IP address) and press Enter.
      tftp *IPaddress*
   b. Type the following and press Enter.
      binary
   c. Type the following (where **filename** is the name of the binary firmware file) and press Enter.
      put *filename* /ram
      A message appears confirming that the file was sent.

d. Type the following and press Enter.
`quit`

4. In the terminal session window, type **`1`** to verify and store the new firmware.
The following message appears.

```
Clearing backup host filename..
Clearing backup host IP address..
Verifying file integrity..
Erasing flash memory..
Programming flash memory..
Verifying..
*PROGRAM LOAD SUCCESSFUL*
```

Type **`fw`**, then type **`1`**.
The active and alternate firmware versions are displayed.

5. If the "alternate version" is anything other than the firmware you just downloaded, verify that the file is good and repeat the download.
6. If you want to activate the alternate version (the newly downloaded firmware):
   a. Type **`2`** to select the alternate version for execution on the next boot cycle.
   b. Type **`1`** to verify that the following message is displayed under the firmware versions: "Note: ALTERNATE selected for execution on next boot cycle." (If this message is not displayed, repeat steps a and b to toggle back.)
   c. Type **`5`** to reboot.
   The management agent disconnects, reboots, and activates the downloaded firmware. The "Disconnecting and Rebooting" message appears.
   The firmware is downloaded.

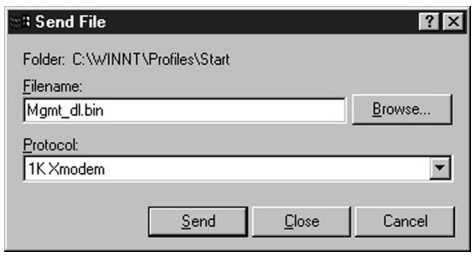
Serial Method (Menu Option 4)

The Serial method for downloading firmware is available for Windows only.

1. Ensure that the switch and workstation are connected through a serial null modem cable.
2. Type **`4`**.
The file transfer facility appears.

Note: To cancel out of the file transfer facility, press CTRL+X several times.

3. Choose **Send File** from the Transfer pull-down menu in HyperTerminal.
The Send File dialog box appears.



4. Type (or browse for) the filename, select "1K Xmodem" from the Protocol drop-down list, and click **Send**.
A status message appears.
5. If the status message says anything other than "File transfer completed," perform the action recommended for the appropriate message shown below.

Message	Action
CRC Error	Try another file. The file you are attempting to download may be corrupted.
Time out error	Cycle power to the switch and retry the download procedure.
Access denied	Close and reestablish the connection. Cycle power to the switch and retry the download procedure.

6. Type **fw**, then type **1**.

   The active and alternate firmware versions are displayed.

7. If the "alternate version" is anything other than the firmware you just downloaded, verify that the file is good and repeat the download.
8. If you want to activate the alternate version (the newly downloaded firmware):
   a. Type **2** to select the alternate version for execution on the next boot cycle.
   b. Type **1** to verify that the following message is displayed under the firmware versions: "Note: ALTERNATE selected for execution on next boot cycle." (If this message is not displayed, repeat steps a and b to toggle back.)
   c. Type **5** to reboot.

      The management agent disconnects, reboots, and activates the downloaded firmware. The "Disconnecting and Rebooting" message appears.

      The firmware is downloaded.

Configuring the Trap Destination Table

Simple Network Management Protocol (SNMP) uses traps to transmit information to other IP Addressable devices on the network.

To view the current Trap Destination settings and a complete list of commands, type: **ct** at the prompt. The Trap Destination Table Menu appears:

```
TRAP DESTINATION TABLE MENU
             IP ADDRESS      PORT  SEVERITY  COMMUNITY   STATE
Event traps:  <none>
FcMgmt traps: <none>

 1. Create new TRAP destination
 2. Delete TRAP destination
 3. Exit menu
```

To create a trap destination:

1. Type **1** to create the new TRAP destination.
2. At the resulting IP address prompt, type the address of the workstation you would like the trap sent to.
3. At the resulting UDP Port prompt, type the number of the listening port (usually "162").

   The Edit Trap Destination Menu appears.

```
EDIT TRAP DESTINATION MENU
              ACTIVE VALUE                      NEW VALUE
    IP Address 172.16.52.2                       172.16.52.2
    Port       162                               162
 1. Community  'public'                          'public'
 2. Severity   Warning                           Warning
 3. State      Inactive                          Inactive
 4. Mode       Event                             Event

 5. Save changes and exit menu
 6. Discard changes and exit menu
```

4. If you want to edit any of the listed options, type the number corresponding to the desired option (community [password], severity, state, or mode) and follow the prompts.

Option	Description
Community	Sets the community string to public or private. An SNMP server has a "community string" which is like a password to get or set information. Most devices have a "public" community string, which enables read-only access to MIBs, as well as a "private" community string that enables you to read and set certain parameters via SNMP. The community strings are case-sensitive. Options: public private
Severity	Select the severity level at which the traps become operational. The default severity level is Warning. Options: 0-Emergency 1-Alert 2-Critical 3-Error 4-Warning 5-Notice 6-Info 7-Debug 8-Mark
State	The state menu choice enables the trap to become active or inactive. Options: 1-Destroy – the trap will be deleted from the table once changes are saved. 2-Inactive – the trap is not operational. 3-Active – the trap sends messages to the host identified in the IP Address selection.
Mode	Determines whether the traps are accessed through the Event interface, the Fibre Alliance interface, or both. Options: 1-Event 3-FcMgmt 4-Both

5. Type **5** to save changes and exit.
   The Trap Destination Table menu appears and displays your saved changes.

To edit a trap destination:

1. Enter the row number for the TRAP destination that you want to edit.
   The Edit Trap Destination Menu appears.
2. Type the number corresponding to the option (community [password], severity, state, or mode) you want to change and follow the prompts.
3. Type **5** to save changes and exit.
   The Trap Destination Table menu appears and displays your saved changes.

To delete a trap destination:

1. Type **3** to select the Delete TRAP destination option.
2. Enter the row number that you want to delete.
   The trap destination is deleted.

Changing the CLI/Web Password

Note: If you do not remember your password, call your customer service representative.

One password is used to access both the Web Manager and the Command Line Interface. You can change the password through the Command Line Interface (CLI) only. The password must be between 6 and 25 characters in length.

To change the password:

1. Type **pw** at the prompt.
2. Enter the current password (the default password is **password**).
3. Enter the new password.
4. Confirm the new password by re-entering it.

   A message appears confirming that the password was saved and activated.

```
>pw
enter current password: ********
enter new password    : ******
re-enter new password : ******
The new password is saved and activated.
```

Viewing Management, Policy, and Threshold Settings

The Management Agent menu displays the current settings for the switch parameters, switch policies, and thresholding. To view the current Management Agent settings and a complete list of commands, type **mc** at the prompt. The Management Agent Menu appears.

```
MANAGEMENT AGENT  00-10-9b-01-0c-dd
       Product                 : Vixel 335 Managed Storage Switch
       Firmware                  : 2.01 (build 79)
       Hardware                  : 3
       IP address                : 172.16.71.14
       Netmask                   : 255.255.240.0
       Default gateway           : 172.16.64.1
       DHCP                      : disabled
       Management URL            : http://172.16.71.14
       POLICIES:
(1)    Smart insertion           : enabled
(2)    Bad zone recovery         : disabled
(3)    No data recovery          : disabled
(4)    LIP F8 recovery           : enabled
(5)    LIP on port bypass        : enabled
(6)    Auto cascade              : enabled
(7)    Bypass at max OS  err     : disabled
(8)    Bypass at max CRC err     : disabled
(9)    Bypass on clock delta err : disabled
(10)   Bypass on switch stall    : disabled
(11)   Clear conn on sw stall    : disabled
       HW I/F:
       ASIC build number         : 0x0001
(12)   OS  error threshold       : 3 (0x3)
(13)   CRC error threshold       : 3 (0x3)
(14)   Switch stall threshold    : 65535 (0xFFFF)
(15)   Clk error thresh (ppm)    : 200 (0xC8)
(16)   Clk error prescale (1-16) : 6
(17)   Err count thresh (CSecs)  : 1000
(18)   Bad zone thresh  (CSecs)  : 500
(19)   Bad zone bypass  (CSecs)  : 10
       ACTIONS:
(20)   Reset switch
(21)   Reset HW
(22)   Reset counters
(23)   Event log
(24)   Fibre Alliance event log
(25)   Fibre Alliance event sev  : Info
```

Policies

Note: The **mc** command must be entered prior to issuing one of the submenu commands.

You can view the current global policy settings and configure the switch to use the policies you select.

Note: Before you type a command for port policies, select the desired port by typing **po #** (where # is the desired port number).

An explanation of the available policies follows:

Policy	Description
`Smart insertion`	Ensures that data meets the requirements of Fibre Channel Arbitrated Loop (FC-AL) and allows sub-policies to be enabled.
`Bad zone recovery`	Reacts to bad zone indications by putting all ports through the normal insertion process and allowing only those ports sending ordered sets to insert.
`No data recovery`	The switch will automatically bypass a port if no K characters (Ordered Sets) are detected within a certain timeframe. The switch will try to reinsert the port upon detection of valid K characters.
`LIP F8 recovery`	Reacts to LIP(F8)s (indicating non-functional zones) by putting all ports through the normal insertion process and allowing only those ports *not* sending LIP(F8)s to insert.
`LIP on port bypass`	Requires bypassed ports to send LIP(F7)s to other zone members.
`Auto cascade`	When this policy is enabled, the switch will automatically configure itself and any other detected Vixel Inspeed devices in a cascade configuration. **Note:** This policy must be set to enabled if auto cascading on a port is enabled.
`Bypass at max OS err`	When this policy is enabled, the switch bypasses a port when that port exceeds the threshold of Ordered Set errors within a certain timeframe. (This policy applies to Zone 1 only.) The default timeframe is 10 seconds (see the Error Count Threshold setting).
`Bypass at max CRC err`	When this policy is enabled, the switch bypasses ports that exceed the set threshold of frame CRC errors. Compares the CRC transmitted with a frame to the CRC calculated in the switch. (This policy applies to Zone 1 only.)
`Bypass on clock delta err`	When this policy is enabled, the switch compares the detected line clock through the frame and the number of fill words inserted or deleted versus the switch's internal clock. If the derived clock delta is too high, the port is bypassed.
`Bypass on switch stall`	When this policy is enabled and switching mode is on, the switch bypasses a stalled port if the connection is not terminated within a certain timeframe (see the Switch Stall Threshold setting).
`Clear conn on sw stall`	When this policy is enabled, the switch clears the port connection on a switch stall after a certain timeframe (see the Switch Stall Threshold setting).

To enable or disable a policy:

1. Enter the number for the desired policy.
2. Enter **2** to enable the policy or **3** to disable the policy.

   To view your changes, type **mc** and an updated list appears.

Threshold Information

Note: The Threshold settings should not be modified unless directed to do so by Vixel Customer Support.

An explanation of the threshold settings follows:

Settings	Description
`ASIC build number`	Assigned number to the internal switch processor. Cannot be modified or configured.
`OS error threshold`	Sets the number of Ordered Set errors that the switch will see on a connection within the Error Count Threshold timeframe.
`CRC error threshold`	Sets the number of CRC errors the switch sees in frames within the Error Count Threshold timeframe.
`Switch stall threshold`	Sets the number of microseconds until a stall is triggered.
`Clk error thresh (ppm)`	Sets the variance between the line-derived clock of fill words and the switch internal clock.
`Clk error prescale (1-16)`	**Note:** This setting should not be modified unless directed to do so by Vixel Customer Support.
`Err count thresh (cSecs)`	Sets the amount of time between error counter reads when threshold errors occur.
`Bad zone thresh (cSecs)`	Sets the amount of time that the zone can be down when the switch thinks the zone should be operational.
`Bad zone bypass (cSecs)`	Sets the amount of time the ports remain bypassed before reinsertion.

To set thresholds:

1. Enter the number for the desired threshold.
2. Enter a value for the threshold.

   To view your changes, type **mc** and an updated list appears.

Actions

Additional actions are available from the Management Agent Menu. An explanation of the actions follows:

Action	Description
`Reset switch`	Resets the switch.
`Reset hardware`	Resets the ASIC (control circuitry) inside the switch but not the switch itself.
`Reset counters`	Resets all or specific counters to zero. Options: 6–reset all port counters in switch 7–reset all RX frame counters in switch 8–reset all conn attempt counters in switch 9–reset all conn stall counters in switch 10–reset all CRC error counters in switch 11–reset all bad OS error counters in switch
`Event log`	Displays the event log for the switch.
`Fibre Alliance event log`	Displays the event log for the switch by the assigned severity level.
`Fibre Alliance event sev`	Sets the severity level for the events displayed in the Fibre Alliance event log. Options: 2–Emergency, 3–Alert, 4–Critical, 5–Error, 6–Warning, 7–Notice, 8–Info, 9–Debug, 10–Mark

To perform an action, enter the specific number for the action and follow the prompts.

Changing the Switching Mode

The Switch Menu allows you to configure the switch, view specific switch information, and turn on/off the switching mode.

To activate the switch control command, type **sw** at the prompt. The Switch Menu appears.

```
SWITCH MENU   (switch ID=14000147)
(1)    Switching Mode    : on
(2)    Link speed        : 2 GBPS
(3)    Blocking ARB      : 255 (0xFF)
(4)    Connect user data : 0
(5)    Hardware
(6)    Enclosure
(7)    Ports
(8)    Zones
(9)    Sweep
(10)   Diagnostics
(11)   Reset counters
```

Additional information on the available options follows:

Command	Description
`Switching Mode`	When "on", allows data to be sent directly to a specified port. If "off", the data is sent to every port. Disabling Switching Mode may be necessary when passing data to legacy devices. To change the switching mode, type **1** and then enter **2** ("on") or **3** ("off") for the desired setting.
`Link Speed`	Displays the current switch speed. To change the switch speed, type **2** and then enter **1** to set the link speed for the next boot. Select **2** (1 Gbps) or **3** (Gbps) for the desired speed setting.
`Blocking ARB`	When two ports start a communication session, the Blocking ARB is sent to any other ports trying to communicate with those specific ports until their connection is terminated. Blocking Arb is only active when the switching mode is on. **Note:** This setting should not be modified unless directed to do so by Vixel Customer Service.
`Connect user data`	Non-functional feature designated for future use.
`Hardware`	Displays the switch hardware information. Also allows you to configure thresholds and error count time period. **Note:** These settings should not be modified unless directed to do so by Vixel Customer Service. To view the switch hardware, type **5** at the prompt.
`Enclosure`	Displays information on fan status, temperature, controller status, and management status. To view the switch enclosure, type **6** at the prompt.

Command	Description
`Ports`	Displays all information concerning a specific port. When a port number (e.g., 2) is entered, the default port number (1) is changed to the new port number. You can also change the port policies. To view port information, type **7** at the prompt. To see additional information for a port, enter the desired port number.
`Zone`	Displays information for the default switch's zone (e.g., 1, 2, etc.), including general and port-specific information. A menu selection is available for each zone. To view zone information, type **8** at the prompt. When the user chooses to view a zone, all information for that zone is displayed along with a port menu listing the ports in that zone.
`Sweep`	Displays ordered sets and error detectors for each port on the switch. To perform a switch sweep, type **9** at the prompt.
`Diagnostics`	Displays diagnostic registers for the default port including the detector, match, control, capture, and tx registers. **Note:** These settings should not be modified unless directed to do so by Vixel Customer Service. To run diagnostics, type **10** at the prompt.
`Reset counters`	Resets all or specific counters to zero. Options: 6–reset all port counters in switch 7–reset all RX frame counters in switch 8–reset all conn attempt counters in switch 9–reset all conn stall counters in switch 10–reset all CRC error counters in switch 11–reset all bad OS error counters in switch To reset counters, type **11** at the prompt. Type the number for the desired option.

Displaying Ports

The Show Port command displays all information concerning a specific port and allows you to change the port policies.
To configure the currently selected port, type **po** at the prompt.To activate the show port command for a specific port, type **po x** (where **x** is the port number) at the prompt.

```
port 1   (switch ID=28000070)
       module           : none
       state            : bypassed
       zone             : 1
       PLL              : nolock
       transceiver LED  : off
       fault LED        : off
       cascade state    : none
       connect type     : none
       insert count     : 0
       clk delta ppm    : 0
       rx frame count   : 2
       connect attempts : 0
       connects busy    : 0
       CRC errors       : 2
       bad OS errors    : 0
       port util avg    : 0
       port util high   : 0
       port util low    : 0
       port util last   : 0
(1)    Control            : auto
(2)    Beacon             : off
(3)    Transmitter        : on
(4)    Cascade mode       : tree
(5)    LIP on insert      : enabled
(6)    Test before insert : disabled
(7)    Overlapping zones  : 0x004
(8)    Util period avg    : 100
(9)    Util period stats  : 100
(10)   Reset counters
```

Setting	Description
`Control`	Enables you to configure control of the port. Select from: (2) auto – the default setting. The switch controls the port and prevents the insertion of incompatible ports which may cause disruption. (3) bypass – removes a port from the zone. Use this mode to troubleshoot ports. (4) extl-loopback – removes a port from the zone and routes the port's receive signal back through the port's transmitter. Use this mode to isolate a specific zone for troubleshooting or test a transceiver's circuitry and attached media from the node end. (5) force insert – allows ports whose transceivers cannot derive a valid clock or "K" character (Ordered Set) to join the zone. Use this mode cautiously – devices without valid characters may put bad data into the zone, causing the zone to go down. (6) diagnostic-tx – allows you to transmit specific Ordered Sets for testing purposes.
`Beacon`	When enabled, it forces both port LEDs to flash on and off continuously on the selected port. You can use the beacon feature to remotely alert a technician to take action on a specific port as identified by a system administrator. The blinking overrides the state information display until the beaconing is turned off.
`Transmitter`	Turns the transceiver connected to the port on or off.
`Cascade mode`	The current cascade mode (auto, none, tree, string) selected for the port. Options: auto – This setting automatically configures the connection type based on information sent by other InSpeed switches. This is the default setting for InSpeed-based managed switches. none – The port is disabled. tree – A port that allows arbitration fairness to other cascaded InSpeed-based switches or ports connected to end devices. If the port is a tree port then the ARB (Arbitrate) is sent down the port and, when the ARB is received back at the ASIC, a connection is made between the source and destination ports. All ports are viewed as 100% FC_AL compliant. string – A specially pre-allocated port designed to maintain fairness when two or more InSpeed-based storage switches are serially cascaded. When the destination port is a string and an OPN is received on the ASIC, an ARB is transmitted throughout the total string cascade loop to alert all devices to enforce the Loop fairness rules. Therefore, if two devices try to ARB for the loop at the same time, the higher Priority AL_PA will win the cascade first, the lower priority one will follow. **Note:** There must be two string ports on a zone. The port is configured for a pair of string ports to other switches.
`LIP on insert`	If enabled, when a port inserts into a zone, it issues LIP(F7)s to other zone members.

Setting	Description
`Test before insert`	Before allowing a port to insert into a zone, the port is monitored for proper Loop Port State Machine (LPSM) protocols. (At least one of the devices on the port must be a Loop Initialization Master (LIM) to follow these protocols.)
`Overlapping zones`	**Note:** This setting should not be modified unless directed to do so by Vixel Customer Support.
`Util period avg`	**Note:** This setting should not be modified unless directed to do so by Vixel Customer Support.
`Util period stats`	**Note:** This setting should not be modified unless directed to do so by Vixel Customer Support.
`Reset counters`	Resets all or specific counters to zero. Options: 2: reset all port counters 3: reset port RX frame counter 4: reset port conn attempts counter 5: reset port conn busy counter 6: reset port CRC errors counter 7: reset port bad OS errors counter To reset counters, type **`10`** at the prompt. Type the number for the desired option.

Viewing the Event Log

The event log command enables you to view the event log.

To activate the event log command, type: **`ev`** at the prompt.

```
  1: 02/27/02 18:38:12.62 [1] agent up
  2: 02/27/02 18:38:12.72 [160] management active
  3: 02/27/02 18:38:12.72 [3] switch added, switch ID=14000147
4: 02/27/02 18:38:12.81 [270] Daytime server up, ip=38.244.18.9
```

The switch event log is very good for troubleshooting, as it shows the events on the switch including bypass events, LIP F8, clock delta, etc.

For a complete list of event messages, see EVENT MESSAGES (**APPENDIX C**) on page 63.

Resetting the Switch

You can reset the switch to implement changes in the CLI.

To reset the switch, type **`rs`** at the prompt.

A message stating the switch is resetting appears.

Resetting the Hardware

This feature resets the ASIC in the switch.

To reset the ASIC, type **`rh`** at the prompt.

A message stating the control circuitry is resetting appears.

Resetting the Switch to Factory Default Settings

If you want to reset the current switch configuration to the factory default settings, type **`rc`** at the prompt.

A message appears asking you to confirm the reset. Type **`Y`** at the prompt to proceed with the reset.

Changing the Switch's Operating Speed

The link speed command enables you to change the switch's operating speed.

To activate the link speed control, type **lsp** at the prompt.

```
SWITCH LINK SPEED   (switch ID=14000147)
       Link speed current : 2 GBPS
       Link speed control : 2 GBPS
(1)    Link speed next    : 2 GBPS
```

Enter either a "2" for 1 Gbps or a "3" for 2 Gbps. You must reset the switch before the speed change becomes effective.

Viewing and Understanding Zoning Information

The switch's command line interface displays the two zone configurations: overlapping zoning and non-overlapping zoning.

For a description of overlapping and non-overlapping zoning, see "Zone Settings" on page 31.

Overlapping Zoning Configuration

Overlapping zoning can only be implemented in Zone 1 and the switch must be operating in switching mode. To participate in overlapping zoning, each port must have their cascade mode configured to "auto".

If the switch is operating using non-overlapping zoning, you can still configure overlapping zoning within the default zone. If a LIP occurs on any port in the default zone, it will affect every port in the default zone, regardless of any overlapping zone configurations. Overlapping zones do not support LIP isolation.

The overlapping zoning configuration displays the ports in Zone 1 and also displays which ports are blocked from seeing each other.

To view the overlapping zone configuration, type **oz**.

The current overlapping zoning configuration, by port, is displayed.

```
Overlapping Zone Configuration   (Switch ID=28000070, Switching Mode=on)

              1  2  3  4  5 11 12
      Port 1     .  X  .  .  .  .
      Port 2  .     .  X  .  .  .
      Port 3  X  .     .  X  .  .
      Port 4  .  X  .     .  .  .
      Port 5  .  .  X  .     .  .
      Port 11 .  .  .  .  .     .
      Port 12 .  .  .  .  .  .
```

To block ports from seeing each other:

1. Type **oz** to view the current overlapping zone configuration.
2. At the prompt, type ***oz a:p1-p2 a:p1-p2 r:p1-p2 ..*** (where a=add port block pair, r=remove port block pair, p1=1st port, and p2=2nd port

   The "-" is optional.

   Example: **oz a:2-4**
   A device on port 2 is blocked from viewing devices on port 4. The opposite holds trues as well (devices on port 4 cannot see devices on port 2).

To remove all port blocks, type **oz r** at the prompt.

Non-Overlapping Zoning Configuration

Note: Ports 11 and 12 can only be in Zone 1.

The non-overlapping zones feature enables you to assign each port on the switch to one of 12 available zones. Each zone is unique which allows for 6 separate zones to function on the same switch. With non-overlapping zoning enabled, each zone is totally independent and LIPs on one zone do not affect the other zones.

You can have simultaneous overlapping and non-overlapping zoning. Overlapping zoning operates in Zone 1 and non-overlapping zoning operates in Zones 2-12.

The non-overlapping zoning configuration shows the zone status, the port state for each zone, the number of active ports in each zone, and the port numbers that are in each zone.

To view zone configuration by zone, type **noz**.

The current non-overlapping zoning configuration, by zone, is displayed.

```
Non Overlapping Zone Configuration By Port
  Port Number:   1  2  3  4  5  6  7  8  9 10 11 12
  Zone Number:   1  1  1  1  1  2  2  2  2  2  1  1
  Port State:    B  B  B  B  B  I  U  B  B  B  B  B
  Zone State:    D  D  D  D  D  U  U  U  U  U  D  D
```

Zone number: Possible values are 1–12.

Port State: Possible values are "B" (Bypassed), "I" (Inserted), "D" (Diagnostic Transmit), "E" (External Loopback), "U" (Unknown), and "?" (Access Error).

Zone State: Possible values are "U" (Up) and "D" (Down).

Note: Each port may only be in one non-overlapping zone.

To place ports into non-overlapping zones:

1. Type **noz** to view the current non-overlapping zones configuration.
2. At the prompt, type **noz *z:p,p,p.. z:p p.. z..*** (where z=zone number 1–12 and p=port number 1–12)

   Ports on a zone may be separated by a comma or spaces.

   Note: Unspecified ports are automatically placed into Zone 1.

   Example: **noz 2:5,6,7,8 3:9,10**
   Ports 5-8 are placed in Zone 2, ports 9-10 are placed in Zone 3, and ports 1-4 and 11-12 are placed into Zone 1.

CHAPTER 4 Technical Reference

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Technical Support

Before contacting Customer Support, check for solutions in this guide. Contact information for Technical Support is provided in the Welcome Letter that came with your switch.

Troubleshooting

Some common troubleshooting situations are listed below with suggested courses of action.

Situation*	Recommended Action
No LEDs are on.	Make sure that the switch is plugged into an adequate AC power source (shown in "Operating Conditions" on page 59).
The switch's Fault LED is on.	Cycle power to the switch. One or more enclosure fans may have failed, or an over-temperature condition may exist. Contact an authorized service person. *If the switch's Fault LED remains lit*, the switch requires repair. Contact an authorized service person.
The Mgmt Present LED is off.	Contact an authorized service person.
The Mgmt Present LED is blinking continuously.	Power cycle the switch to see if the condition clears. *If the Mgmt Present LED continues to blink* (and POST has already completed), firmware may be corrupt or hardware may have failed. Contact an authorized service person.
The Enet Active LED is off during an ethernet connection.	Check the following items: • Ethernet RJ-45 connection to the Vixel 335 Managed Storage Switch. • Ethernet connection to the Ethernet switch. • Power status of the Ethernet switch. • Power status of the Vixel 335 Managed Storage Switch.
The Switch Op LED is off or flashing.	Check the following items: • Ports (LEDs and SFPs). • Cabling. • Bad / misbehaving HBA / FC controller at the node end. **Note:** The switch automatically recovers all zones for the most common failure conditions.

* LEDs that are on are illuminated; LEDs that are off are extinguished.

Small Form-Factor Pluggable (SFP) Issues

Items to check for common SFP-related symptoms are listed below.

Problem	Recommended Action
SFP installed in one or more ports but no LEDs lit	Verify power cord is firmly seated into switch and is connected to a properly earthed receptacle (outlet). Check the Power LED to ensure switch is turned on.
SFP installed but only yellow LED is lit	Re-seat the SFP. If the same condition occurs, the SFP is probably faulty and should be replaced.
SFP installed with both green and yellow LEDs lit	The switch is not receiving a valid Fibre Channel signal from the end node (HBA or disk array) or is receiving LIP(F8). 1) Ensure that the device is powered on and operating properly. 2) Unplug the fiber cable from the node and verify that an optical signal is present on the cable receiver lead. 3) Examine the connectors on the HBA or disk controller for correct and proper connection. If optical power meter is available, verify the device is transmitting a signal. If there is no signal present, the device may require rebooting, device drivers may need to be reinstalled, or the HBA or disk controller hardware may require servicing. If a signal is present on both the cable lead and the end node, the HBA or disk controller may require service.
SFP installed with only green LED lit, but devices are not communicating	The switch is receiving a valid Fibre Channel signal from the end device (HBA or disk), but no upper level protocols are active. 1) Verify that the proper HBA device drivers are loaded for the appropriate operating system and that the host has been configured to recognize attached disk devices. 2) Check the Switch Op LED. If the Switch Op LED is on, the devices have completed initialization. If the Switch Op LED is off, the devices were not initialized. Remove all the devices and add one device at a time to isolate the device responsible for the failure. 3) Improper initialization could result from a defective or inoperative adapter card or device. Run adapter diagnostics with a loopback connector to see if the adapter is working properly. 4) Unplug the fiber cable from the end node and verify that an optical signal is present on the cable receiver lead. If no signal is present, the receiver lead of the cable may be bad and the device may be streaming LIP(F8). Ensure that all cascaded ports are correctly configured.

Fibre Channel References

The following books give useful information about Fibre Channel.

- Alan F. Benner, *Fibre Channel*. McGraw-Hill, 1996. ISBN 0-07-005669-2.
- Tom Clark, *Designing Storage Area Networks*. Addison Wesley Longman, 1999, ISBN 0-201-61584-3.
- Jan Dedek, *Fibre Channel - The Basics*. ANCOT Corporation, 1997. ISBN 0-9637439-3-7.
- Robert Kembel, *Arbitrated Loop*. Connectivity Solutions, 1996. ISBN 0-931836-82-4.
- Robert Kembel, *A Comprehensive Introduction*. Connectivity Solutions, 1998. ISBN 0-931836-84-0.

Appendixes

APPENDIX A Specifications

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Specifications

The switch's specifications are listed below:

Number of Ports	12
Operating Rate	1.0625 or 2.125 Gbps
Port Media Type	SFP
Enclosure	1U full-rack form factor
Management Interface	RS-232 or 10BaseT Ethernet
Operating Mode	Switching or Non-switching modes
Configurability	Management interface configurable
Power On Self Test (POST)	Yes
Dimensions	Approximately 17.2" x 1.72" x 14.54" (W x H x D)
AC Power Input	50 or 60 Hz / 100 – 250 VAC / 0.6 – 0.4 A
AC Power Connector	IEC connector
Weight	Approximately 11 lbs

Operating Conditions

The switch must be operated in a clean, dry environment with unrestricted airflow. Air flows in through the cosmetic end and out through the business end (sometimes called the transceiver end or "back-of-box").

To avoid overheating, maintain a minimum clearance of two inches (50.8 millimeters) on each end of the switch (the cosmetic end and the business end). Allow an adequate amount of space on the top and sides of the switch for proper air ventilation. Do not place the switch on heat-generating surfaces. Operating conditions are listed below.

Vixel Model 335 Operating Conditions

Requirement	Value
Operating Temperature	0°C to 40°C normal operation (ambient air temperature)
Storage	-40°C to 80°C non-condensing
Power	50 or 60 Hz / 100 – 250 VAC / 0.6 – 0.4 A

APPENDIX B CLI Console Commands

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Console Commands

All of the commands below are ordered generally by category. The format of the commands is given in the list, however, the "help" command at the command line may give even more detail.

Command	Syntax	Action
General Commands		
Configure	co	Displays information on the switch's IP parameters: IP Address, default gateway, and netmask. You can also enable/disable DHCP.
System Information	si	Displays switch information such as switch name, location, and contact.
Manage Firmware	fw	Displays the current firmware image and the alternate image. You can also select to use the alternate image or download new firmware.
Configure TRAP Destination Table	ct	Displays the current trap destination table and allows you to create/delete trap destinations.
Log In	li	Prompts for password.
Log Out	lo	Exits the CLI session.
Set Password	pw	Sets new console password
Ping	ping ping <x.x.x.x>	Sends packets to specified device to confirm communication between devices.
Help	? ? <cmd> h h <cmd> help help <cmd>	Displays all or specific help.
Browse Commands		
Show Management Menu	mc	Displays overall status of the switch and its policies. Allows configuration of policies and thresholds.
Show Switch Menu	sw	Displays the current switching mode, blocking AL_PA, and menu of switch informational commands.

Command	Syntax	Action
Show Hardware Menu	sh	Displays hardware information and versions.
Show Enclosure Menu	se	Displays information on fan status, temperature, controller status, and management status.
Show Diagnostics Menu	sd	Displays diagnostic registers for the default port. This includes the detector, match, control, capture and tx registers.
Show Zone	zo zo <ZoneID>	Displays information for the default switch' s zone, including general and port-specific information. Provides a menu selection for each zone.
Show Port	po po <port ID>	Displays all information concerning a specific port. When a port number is entered, the default port number (1) will be changed to the new port number. This command also allows changing port policies.
Show Port Serial Transceiver Data	sid	Displays the serial ID information of the transceiver in the default port.
Show Port Clock Delta Register	pcdr pcdr <port ID>	Reads the port Clock Delta register. Enter a specific port number for the portID.
Show Zone Table	sz	Displays general status of all zones on the switch. Provides a menu selection for each zone.
Show Port Table	sp	Displays general status of all ports for the default zone. Provides a menu selection for each port.
Show Revision Table	rev	Displays the revision levels of the installed firmware.
Show Sensor Table	sen	Displays Fan/PS/Temperature sensor status.
Show Switch Sweep	ss sweep	Displays the results of a single switch diagnostic sweep.
Show MIB Event Log	ev ev <eventID> ev cl<ear> ev re<set>	Displays all event log entries, or all event log entries after <eventID>. The Clear option clears events up to the current time – after which a return will display new events only. The reset starts at the beginning of the event buffer. Up to 512 events are stored in the buffer.
Show Fibre Alliance Event Log	faev	Displays event log entries based upon the selected severity level.
Show Operating System Stacks	stack	Displays commands in the operating system stacks.
Action Commands		
Reset Switch	rs	Resets the switch and ASIC.
Reset Switch Hardware	rh	Resets the ASIC.
Reset Switch Configuration	rc	Resets the switch to factory default settings.
Link Speed	lsp	Sets the switch speed at 1 Gb/s or 2 Gb/s.

Command	Syntax	Action
Configure Non-overlapping Zones	noz noz z:p,p,p.. z:p p.. z..	Configures ports for non-overlapping zones. Values: z = zone number 1 to 12 p = port number 1 to 12 **Note:** Unspecified ports are placed into zone 1. Each port must be in one non-overlapping zone only. Ports on a zone may be separated by a comma or spaces.
Configure Overlapping Zones (Port blocks in switching mode)	oz oz a:p1-p2 a:p1-p2 r:p1-p2 .. oz r	Configures ports for overlapping zones. Values: a = add port block pair r = remove port block pair p1 = 1st port (must be in non overlapping zone 1) p2 = 2nd port (must be in non overlapping zone 1) "-" is optional r = remove all port blocks
Set Management URL	url= url=<value>	Sets the Fibre Alliance URL value. Use "-" to reset to default.
Set Daytime Server IP Address	ipt	Sets the IP Address for the daytime server.
Set Daytime Server Update Period	dlyt	Sets the interval for validating switch time with the daytime server.
Set Time Mode	time	Sets the switch time manually.

APPENDIX C Event Messages

The event messages are listed by reference number. Also included are the event descriptions, recommended actions, reference numbers, and the message's applicable severity level, which are each defined below:

- Emergency—immediate action required; system failing
- Alert—unrecoverable condition reported; major event in progress
- Critical—event failed with possible loss of integrity
- Error—condition failed; action required
- Warning—failed event occurred; no action required
- Notice—configuration error or abnormal event occurred; no action required
- Info—event occurred; no action required
- Debug—internal message for development (excluded in this list)
- Mark—message marker (excluded in this list)

These severity levels can be used to designate which events trigger trap messages. For Vixel Switches, you can also designate the minimum severity level of events to be logged in the Event Log and at which to illuminate the switch's Fault LED.

Ref	Event Message	Meaning	Action	Severity
1	Agent up	The switch's management agent was up. (This message begins the event log at each session.)	---	Info
3	Switch added	The switch was added.	---	Info
5	Switch reset	The switch was reset.	---	Info
10	Switch loopback failure	ASIC failed its power on self test (internal test).	Contact an authorized service representative.	Alert
20	Smart insertion mode on	The Smart Insertion policy is enabled.	---	Notice
21	Smart insertion mode off	The Smart Insertion policy is disabled.	---	Notice
22	Switch in switching mode	The switch is running in switching mode.	---	Notice
23	Switch in normal mode (switching off)	The switch is running in normal mode (switching is disabled).	---	Notice
100	Fan okay	The state of a switch fan changed to "okay."	---	Info
101	Fan fault	The state of a switch fan changed to "fault."	Replace the fan.	Alert
110	Temperature okay	The switch temperature changed to "okay."	---	Info
111	Temperature warm	The switch temperature changed to "warm."	---	Warning
112	Temperature hot	The switch temperature changed to "hot." A fan may have failed or the temperature of the location may be exceeding the switch's environmental requirements.	Power off the switch and contact an authorized service representative.	Alert
120	Power okay	The state of the switch power supply changed to "okay."	---	Info
121	Power fault	The state of the switch power supply changed to "fault."	---	Alert

Ref	Event Message	Meaning	Action	Severity
132	Zone up then down	The zone state has cycled through the "up" and "down" states several times. Current zone state (at the time of this message) is down.	---	Warning
133	Zone down then up	The zone state has cycled through the "up" and "down" states several times. Current zone state (at the time of this message) is up.	---	Warning
140	Port inserted	A port was inserted onto the zone (after being bypassed).	---	Info
141	Port bypassed (LIPF8)	A port was bypassed (could not insert) because a LIP(F8) was received at port input. (A LIP(F8) indicates a loop failure.)	Check all connections for the specified port.	Info
142	Port bypassed (tx fault)	A port was bypassed because the switch detected a transmitter fault on the port's transceiver.	Contact an authorized service representative. The transceiver may need replacing.	Info
143	Port bypassed (timeout)	A port was bypassed (could not insert) because no LIP(F7)s were received after continuous transmission of LIP(F7)s for 112 milliseconds.	---	Info
145	Port bypassed	A port was bypassed for a reason other than transceiver transmitter fault, invalid response, or manual bypass.	---	Info
146	Port bypassed then inserted	A port was bypassed, then inserted.	---	Info
147	Port inserted then bypassed	A port was inserted, then bypassed.	---	Info
150	Transceiver inserted	A transceiver was inserted.	---	Notice
151	Transceiver removed	A transceiver was removed.	---	Notice
160	Management active	Agent is operational.	---	Info
165	Agent task asserted on prev exec cycle	During normal operations, an attempt to execute a command was aborted due to an internal error in the firmware. The switch automatically resets after the occurrence.	Contact an authorized service representative.	Critical
166	Agent machine exception on prev exec cycle	A task attempted to execute an unknown command. The switch automatically resets after the occurrence.	Contact an authorized service representative.	Critical
170	Diagnostic function aborted	A diagnostic setting is misconfigured and required a firmware override.	Check diagnostic settings for incompatibilities.	Warning
200	CRC error detected	CRC errors were detected in a frame received on a port.	No action required. You can modify the CRC Error threshold through the Web Manager or CLI interface.	Info
201	CRC error threshold exceeded	During the past ten seconds, the number of CRC errors in frames received by the specified port exceeded the current threshold value.	No action required. You can modify the Error Count threshold through the Web Manager or CLI interface.	Info
202	OS Error threshold exceeded	During the past ten seconds, the number of OS errors (invalid transmit words, or 8b/10b encoding errors) in frames received by the specified port exceeded the current threshold value.	No action required. You can modify the Error Count threshold through the Web Manager or CLI interface.	Info

Ref	Event Message	Meaning	Action	Severity
203	Port switch connect overflow	A number of stalls have occurred in a specific amount of time.	---	Info
204	Port switch stall	An instance occurred where two devices could not disconnect communications with one another.	---	Info
205	Port switch bad open	A device is trying to send an OPN but it cannot be delivered.	---	Info
206	Port clock delta freq error	The switch clock or a device clock are not synchronized. If the switch clock has failed, the error should display on multiple ports. If only one port is logging this error, it is most likely a problem with that device.	---	Info
207	Port clock delta freq ok	The switch clock and a device are synchronized.	---	Info
208	Bad zone detected	Refers to the zone health.	---	Info
209	Cascade user mode overridden	A user setting for cascades has been overridden by the firmware.	---	Info
210	Console password changed	The command line interface password was changed. **Note:** The password cannot be changed without supplying the current password, even if logged on.	---	Notice
241	Port bypassed (external loopback)	A port was bypassed manually, through either the command line interface or a management entity.	---	Info
242	Port bypassed (diagnostic TX)	A port was bypassed manually, through either the command line interface or a management entity.	---	Info
243	Port bypassed (Loss of RX signal)	Although a transceiver is present, the port is bypassed because there is no signal coming into the port.	---	Info
244	Port bypassed (Loss of Sync)	Although a transceiver is present, the port is bypassed because the port lost sync with the fibre channel signal (no command characters were received).	---	Info
250	Port transmitter enabled	A port transmitter was turned on, through either the command line interface or a management entity.	---	Notice
251	Port transmitter disabled	A port transmitter was turned off, through either the command line interface or a management entity.	---	Notice
260	Key feature enabled	A purchased license key for an optional feature was entered, through either the command line interface or a management entity.	---	Info
261	Key feature disabled	An optional feature was disabled, through either the command line interface or a management entity.	---	Notice
270	Daytime server up	The daytime server is running.	---	Info
271	Daytime server down	The daytime server is not running.	---	Notice

Ref	Event Message	Meaning	Action	Severity
272	Daytime mode changed	The current daytime mode (none, user, server) has changed.	---	Info
273	Daytime server IP Address changed	The IP Address for the daytime server has changed.	---	Info
274	Daytime server update period changed	The amount of time the daytime servers waits between updates has changed.	---	Info
275	MIB Eventlog Reset	The event log has been cleared out through the Web Manager interface.	---	Info

APPENDIX D Loop ID—AL_PA Cross References

Arbitrated Loop Physical Addresses								
AL_PA	Loop ID		AL_PA	Loop ID		AL_PA	Loop ID	
(hex)	(hex)	(decimal)	(hex)	(hex)	(decimal)	(hex)	(hex)	(decimal)
EF	00	0	A3	2B	43	4D	56	86
E8	01	1	9F	2C	44	4C	57	87
E4	02	2	9E	2D	45	4B	58	88
E2	03	3	9D	2E	46	4A	59	89
E1	04	4	9B	2F	47	49	5A	90
E0	05	5	98	30	48	47	5B	91
DC	06	6	97	31	49	46	5C	92
DA	07	7	90	32	50	45	5D	93
D9	08	8	8F	33	51	43	5E	94
D6	09	9	88	34	52	3C	5F	95
D5	0A	10	84	35	53	3A	60	96
D4	0B	11	82	36	54	39	61	97
D3	0C	12	81	37	55	36	62	98
D2	0D	13	80	38	56	35	63	99
D1	0E	14	7C	39	57	34	64	100
CE	0F	15	7A	3A	58	33	65	101
CD	10	16	79	3B	59	32	66	102
CC	11	17	76	3C	60	31	67	103
CB	12	18	75	3D	61	2E	68	104
CA	13	19	74	3E	62	2D	69	105
C9	14	20	73	3F	63	2C	6A	106
C7	15	21	72	40	64	2B	6B	107
C6	16	22	71	41	65	2A	6C	108
C5	17	23	6E	42	66	29	6D	109
C3	18	24	6D	43	67	27	6E	110
BC	19	25	6C	44	68	26	6F	111
BA	1A	26	6B	45	69	25	70	112
B9	1B	27	6A	46	70	23	71	113
B6	1C	28	69	47	71	1F	72	114
B5	1D	29	67	48	72	1E	73	115
B4	1E	30	66	49	73	1D	74	116
B3	1F	31	65	4A	74	1B	75	117
B2	20	32	63	4B	75	18	76	118
B1	21	33	5C	4C	76	17	77	119
AE	22	34	5A	4D	77	10	78	120
AD	23	35	59	4E	78	0F	79	121
AC	24	36	56	4F	79	08	7A	122
AB	25	37	55	50	80	04	7B	123
AA	26	38	54	51	81	02	7C	124
A9	27	39	53	52	82	01	7D	125
A7	28	40	52	53	83	00	7E	126
A6	29	41	51	54	84	---	7F	127
A5	2A	42	4E	55	85	---	---	---

APPENDIX E Glossary

AL_PA or Arbitrated Loop Physical Address	A one-byte value used to identify a port in an Arbitrated Loop topology. The value of the AL_PA corresponds to bits 7:0 of the 24-bit Native Address Identifier.
Arbitrated Loop	A Fibre Channel topology structured as a loop and requiring a port to successfully arbitrate prior to establishing a circuit to send and/or receive frames.
Arbitration	The process of selecting one respondent from a group requesting service at the same time.
Close (CLS)	An Arbitrated Loop protocol used to terminate a loop circuit.
Current Fill Word	The fill word that the Loop Port State Machine uses when a fill word is to be transmitted.
DHCP	Dynamic Host Control Protocol. An Internet-based protocol enabling nodes to dynamically acquire network addresses for periods of time.
Duplex Cable	Two fibers in one cable suitable for duplex transmission.
Fiber Optics	Light transmission through optical fibers for communication or signaling
Fibre Channel	Fibre Channel is a data transfer interface technology that maps several common transport protocols including IP and SCSI, allowing it to merge high-speed I/O and networking functionality in a single connectivity technology. Fibre channel is an open standard as defined by ANSI and OSI standards and operates over copper and fiber optic cabling at distances of up to 10 Kilometers. It is unique in its support of multiple inter-operable topologies including point-to-point, arbitrated-loop and switching and it offers several qualities of service for network optimization. With its large packet sizes, Fibre Channel is ideal for storage, video, graphic and mass data transfer applications.
LED	Light-Emitting Diode. A status indicator on a switch.
LIP/LIP sequence	Loop Initialization Primitive. A sequence used to accomplish one or more of the following objectives: • Initiate a procedure that results in unique addressing for all nodes. • Indicate a switch failure. • Reset a specific node.
Mb/s	Megabits per second, 1,024,000 bits per second.
MB/s	Megabytes per second, 8,192,000 bits per second. One byte = 8 bits
Node	An entity with one or more N_Ports or NL_Ports.

Non-overlapping Zones	Enables the switch to be divided into separate environments, where each environment sustains a complete 127-device AL_PA space.
Open	An Arbitrated Loop protocol used to establish a switch circuit.
Overlapping Zones	Devices on one port are not allowed to see devices on another port, yet those same devices can both see a device on a third port.
Protocol	A data transmission convention which may include timing, control, formatting, error detection with correction and data representation.
SCSI	Small Computer System Interface. Standard interface for storage modules.
SFP	Small Form-Factor Pluggable transceiver. These transceivers are fully compliant with the FC-PI and MSA standards and occupy less than half the board space of the existing GBIC products.
SNMP	Simple Network Management Protocol. A protocol for managing systems and devices in a network. Supports the retrieving data, writing data, and setting traps indicating events.
Topology	The logical and/or physical arrangement of stations on a network. Fibre Channel topologies include point-to-point, Arbitrated Loop, and switched fabric.
Transceiver	A device that converts one form of signaling to another for both transmission and reception. SFPs and GBICs are transceivers.
Zoning	Dividing a network into separate areas to group devices and isolate traffic.

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